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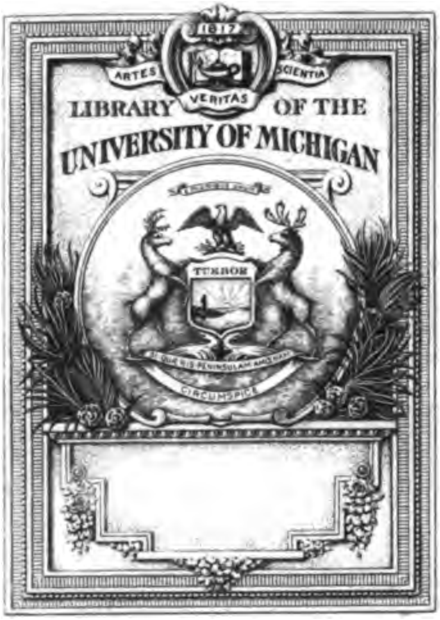

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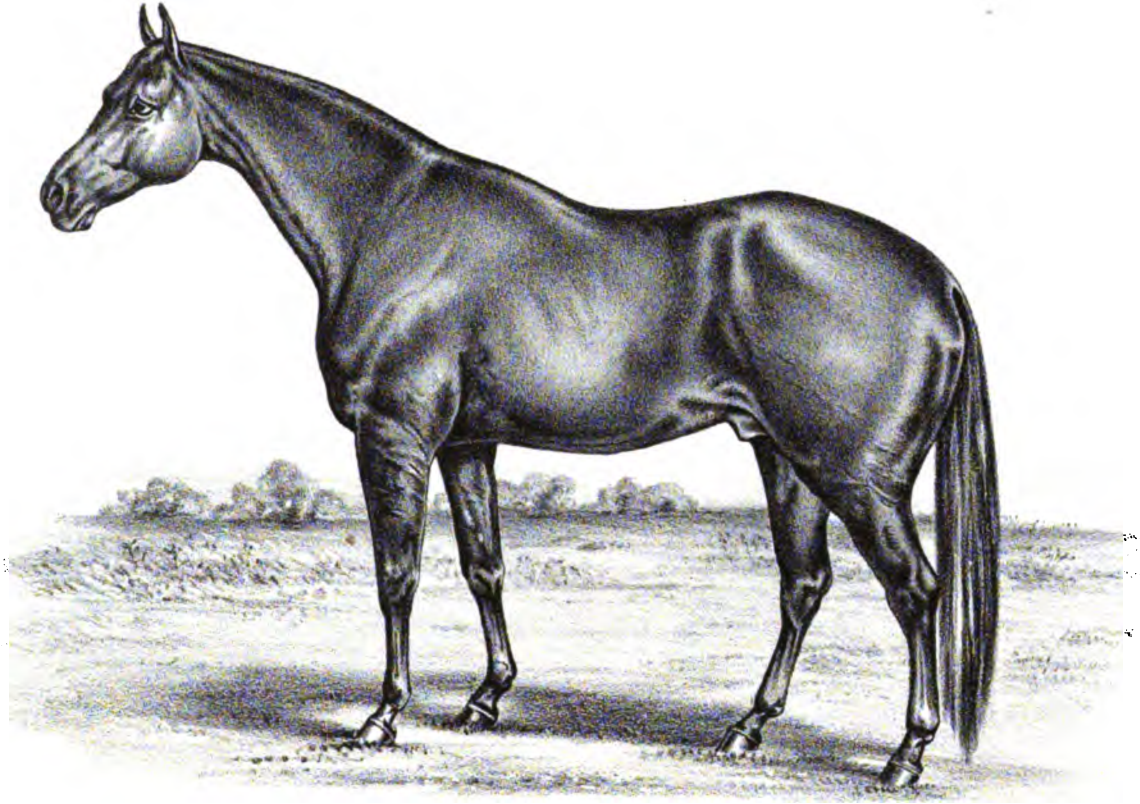

"MIDNIGHT"

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FOR THE [illegible]

VOLUME XII.

HARRISBURG,
LANE S. HART,
STATE PRINTER & BINDER.
1877.

REPORT

OF THE

TRANSACTIONS

OF THE

PENNSYLVANIA STATE AGRICULTURAL SOCIETY,

FOR THE YEAR 1877.

VOLUME XII.

HARRISBURG,
LANE S. HART,
STATE PRINTER & BINDER.
1877.

MU

TO THE READER.

The present, Vol. XII of the transactions of the Pennsylvania State Agricultural Society, will be found of unusual interest.

For the purpose of affording the Centennial exhibition every facility to make that memorable event successful, this society omitted its annual exhibition in 1876, voting, in addition, $1,000 to the agricultural fund of the commission, to be awarded by its officers for such display of agricultural products as they considered worthy of commendation. How that donation has been expended, and with what results, is detailed in the reports presented in this publication.

An ample report of the fine display on exhibition at Erie, in 1877, is also presented. The products, implements, cattle, horses, sheep, and other farm stock, were of unusual excellence. In a practical form, the capabilities of the north-western part of Pennsylvania, as a farming, grazing, manufacturing, and mineral region, was creditably represented. Proving conclusively, that it is not inferior to any portion of the Commonwealth in every economic quality of that which best constitutes a State.

Visitors were both surprised and gratified at the magnitude and excellence of the collection brought before them at the exhibition there. The attendance was large and the weather propitious.

The great oil belt, in close proximity to Erie, has developed a source of wealth over its area, of uncommon magnitude, as well as a new industry. This has caused the production of many ingenious mechanical contrivances, only employed in this territory. Spectators from abroad were struck with admiration at this department of the exhibition. It foreshadowed immense demand for agricultural products, evoked by an active industry, which is constantly and rapidly increasing, ready to consume all its prolific soil is capable of preparing for a market.

Those enterprising Pennsylvanians who go westward for more kindly soil or cheaper farms, would do well to examine this portion of their own State before they decide to leave the pleasant land with whose government and habits they are well acquainted, for one made of all nationalities, and strange to the stable and successful customs of the farmers of Pennsylvania.

HARRISBURG, *Dec. 1877.*

VIRTUE
LIBERTY AND
INDEPENDENCE

CONSTITUTION

OF THE

PENNSYLVANIA STATE AGRICULTURAL SOCIETY.

THE PENNSYLVANIA STATE AGRICULTURAL SOCIETY was created a " body corporate " by the Legislature, on the 29th day of March, 1851. The act at large can be found in the statutes for 1851, and in previous volumes of the transactions of this Society. The Society sprung from a meeting held at Harrisburg, on the 21st of January, 1851, in which all the counties of the State were represented. On the 22d, the meeting had taken the form of a society, electing its first president and officers. On the 20th of January, 1852, it held its first annual meeting at Harrisburg, where, in the previous September, its first exhibition had been held, with a good degree of encouragement. Exhibitions have since been held at Lancaster, Pittsburg, Philadelphia, Harrisburg, Wyoming, Norristown, Williamsport, Easton, Scranton, and Erie, with varying success, but always doing something toward developing the agricultural resources of the State.

The concerns of the Society are entrusted to an Executive Committee, consisting of a president, twenty-four vice presidents, one from each of the congressional districts into which the State is divided, five additional members, all the ex-presidents, a corresponding and recording secretary, a treasurer, a chemist and geologist, and a librarian, in all, as at present, constituted, a committee of forty.

The constitution has been frequently, but not substantially, amended since its original adoption, in 1852, and now stands as it is given herewith. A list of life members is embodied in this issue. It has been impossible to preserve a necrological register, and, therefore, lapses by death are not noted. The list comprises the names of life members previously to the 1st January, 1877 ; a total of 798 names, representing all parts of the State.

CONSTITUTION OF THE PENNSYLVANIA STATE AGRICULTURAL SOCIETY.

The name of the Society shall be the PENNSYLVANIA STATE AGRICULTURAL SOCIETY. The objects of this Society are to foster and improve agriculture, horticulture, and the domestic and household arts.

WHO ARE MEMBERS.

SECTION 1. The Society shall consist of all such persons as shall pay to the Treasurer not less than two dollars, and annually, thereafter, not less than two dollars ; and, also, of honorary and corresponding members ; the names of the members to be recorded by the Secretary.

The officers of county agricultural societies in this State, or delegations therefrom, shall be members *ex officio* of this Society.

The payment of twenty dollars shall constitute life membership, and exempt the members so contributing from all annual payments.

OFFICERS.

SECTION 2. The officers of this Society shall be a President, a Vice President from each congressional district, three fourths of whom shall be practical agriculturists or horticulturists, a Treasurer, a Corresponding Secretary, a Recording Secretary, a Librarian, an Agricultural Chemist and Geologist, and such assistants as the Society may find essential to the transaction of its business; an Executive Committee, consisting of the above-named officers, five additional members, with the ex-presidents of the Society.

OF THE PRESIDENT.

SECTION 3. The President shall have a general superintendence of all the affairs of the Society. In case of the death, illness, or inability of the President to perform the duties of his office, the Executive Committee shall select a Vice President to act in his stead, who shall have the same power and perform the same duties as the President, until the next annual meeting.

OF THE VICE PRESIDENTS.

It shall be the duty of the Vice President to take charge of the affairs of the Association in their several districts; to advance all its objects; to call upon farmers to report as to the condition of agriculture in their neighborhood ; to ask for information as to the modes of cultivation adopted by different farmers; and as far as in their power to make known the resources of their districts, the nature of its soil, its geological character, and all such matter as may interest farmers in every part of the State.

TREASURER.

The Treasurer shall keep an account of all moneys paid into his hands, and shall pay bills when audited and approved by the Executive Committee; each order for payment must be signed by the President or chairman of the Executive Committee.

CORRESPONDING SECRETARY.

Thn duty of this officer shall be to invite a correspondence with all persons interested in agriculture, whether in the State of Pennsylvania or elsewhere, but especially with our consuls in foreign countries, that new seeds, vegetables, or live stock may be introduced, and their fitness for cultivation and propagation in our climate be tested. At each stated meeting of the Society, he shall read his correspondence, which shall, either the whole, or such parts as may be selected by the Society, form a portion of the transactions. He shall also correspond with the president or other officers of each State society in the United States, at least twice in the year, for purposes of combined and mutual action, and to be informed of the result and progress of each other's efforts; also, to invite mechanics to forward models or implements for examination and trial.

RECORDING SECRETARY.

The Recording Secretary shall keep the minutes of the Society and of the Executive Committee. At the close of each year he shall prepare for publication such parts of the minutes and transactions of the Society as may be designated.

LIBRARIAN.

The Librarian shall take charge of all books, pamphlets, &c., belonging to the Society, and shall act as curator to preserve seeds, implements, or whatever property the Society may possess.

EXECUTIVE COMMITTEE AND QUORUM.

The Executive Committee shall transact the business of the Society generally, and shall appoint, annually, at their first quarterly meeting, a Recording Secretary and Treasurer, fix their salaries, and require security from the Treasurer, if they deem it necessary; shall superintend and direct the publication of such of the reports and transactions as they may deem proper, and shall designate the time and places for annual exhibitions, regulate the expenditures, examine all accounts, and keep such general charge of the affairs of the Society as may best promote its interests.

They shall select their own chairman, and meet quarterly, and at any other time when convened by the President; five members shall form a quorum.

They shall call special meetings of the Society when necessary.

ANNUAL MEETING OF THE SOCIETY AND QUORUM.

SECTION 4. The Society shall meet, annually, on the third Wednesday of January, at Harrisburg, when all the officers of the Society, not otherwise appointed, shall be elected by ballot for the ensuing year, and until another election. They shall also hold a general meeting at the time of the annual exhibition, and special meetings whenever convoked by the Executive Committee.

Fifteen members shall form a quorum for the transaction of business, but no member in arrears shall be entitled to the privileges of the Society.

QUALIFICATIONS OF VOTERS.

SECTION 5. No annual member, hereafter, shall be entitled to vote for the election of officers of the Pennsylvania State Agricultural Society, unless he shall have been a member at the previous State fair, and in default of a State fair, then three months previous membership shall be necessary.

SECTION 6. No one shall be eligible to office hereafter who has not obtained a right to vote under section five.

ALTERATION.

SECTION 7. This constitution may be altered or amended at the annual meetings in January, by a vote of two thirds of the members in attendance.

LIFE MEMBERS.

Austin, John B., Philadelphia.
Alibone, Thomas, Philadelphia.
Allen, Josiah J., Philadelphia.
Anspach, J., Jr., Philadelphia.
Armstrong, James, Williamsport.
Allen, Robert P., Williamsport.
Andrus, D. S., Williamsport.
Allen, Charles, Williamsport.
Armstrong, William H. Williamsport.
Allen, John H., Montourstown.
Ayres, J. J., Williamsport.
Andrews, E., Williamsport.
Allen, Wm. H., Agricultural College.
Armstrong, W. H., Easton.
Ashbridge, E. B., Willistown Inn P. O.
Allen, John E., Middletown.
Alricks, William K., Harrisburg.
Allen, John F., Harrisburg.
Anderson, James, Hogestown.
Bucher, G. H., Hogestown, Cumb. co.
Biddle, Craig, Philadelphia.
Boal, George, Boalsburg.
Bryson, Robert, Carlisle.
Baldwin, M. W., Philadelphia.
Brock, Wm. Penn, Philadelphia.
Biddle, Alexander, Philadelphia.
Brown, George H. Philadelphia.
Bolden, George, Philadelphia.
Bard, Edwin Milford, Philadelphia.
Baxter, Isaac B., Philadelphia.
Burnside, James, Bellefonte.
Benson, Alexander, Philadelphia.
Bonson, G. S., Philadelphia.
Bradford, Vincent L., Philadelphia.
Brown, John A., Philadelphia.
Billings, James B., Philadelphia.
Brown, David S., Philadelphia.
Baker, Elias, Altoona.
Brautigam, Daniel, Northumberland.
Brown, Jacob B., Columbia.
Bell, Samuel, Reading.
Bell, William, Mifflin.
Bennett, James, Pittsburg.
Beck, John B., Williamsport.
Bowman, Samuel, Wilkesbarre.
Breeze, N. W., Wyoming.
Barto, Tobias, Reading.
Bercaw, Abraham, Easton.
Berkenbine, Samuel A., Northumberland.
Blair, Horace H., Williamsport.
Beard, Henry, Williamsport.
Beck, Samuel M., Williamsport.
Brown, James V., Williamsport.
Brown, Jacob, Newberry.
Berry, John J., Williamsport.
Bush, D. G., Bellefonte.
Butt, Charles H., Williamsport.
Bender, George H., Easton.
Blight, George, Germantown.
Boyd, T. S., Easton.
Brawdy, George, Sharpsburg.
Bergner George, Harrisburg.
Bissell, William S., Pittsburg.
Bittenbender, Stephen, Shamokin.
Brown, G. W., M. D., Port Carbon.
Boyd, S. T., Easton.
Buehler, William, Harrisburg.
Boas, C. A., Harrisburg.
Bates, Abram, Harrisburg.
Bigler, Samuel S., Harrisburg.
Bomberger, Jacob C., Harrisburg.
Boyer, W. W., Harrisburg.
Briggs, John H., Harrisburg.
Boas, D. D., Harrisburg.
Bird, Joseph, Northumberland.
Buehler, Charles, Harrisburg.
Barr, W., Dr., Harrisburg.
Baily, Charles L. Pottstown.
Brown, James C., New Greenville.
Bound, David T., Kingston.
Bronson, D. H., Coatesville.
Cameron, Simon, Middletown.
Curwin, John, Harrisburg.
Chambers, Andrew R., Philadelphia.
Christian, S. J., Philadelphia.
Campbell, Hugh, Philadelphia.
Campbell, James R., Philadelphia.
Cadwallader, George, Philadelphia.
Colkit, C., Philadelphia.
Craig, Hugh, Philadelphia.
Carpenter, George W., Jr., Germantown.
Campbell, Thompson, San Francisco, Cal.
Cassidy, Joseph A., Philadelphia.
Clark, Edward S., Philadelphia.
Carmalt, S., Friendsville, Susquehanna co.
Cresson, John C., Philadelphia.
Carlisle, Robert M., Philadelphia.
Cornell, Adrian, Newton, Bucks co.

Campbell, William S., Philadelphia.
Cowden, J. B., Northumberland.
Chess, Moses, Temperanceville.
Colder, William, Harrisburg.
Conyngham, John N., Wilkesbarre.
Carson, George N., Norristown.
Cake, Joseph W., Northumberland.
Colder, James, Rev., Harrisburg.
Clymer, Heister, Reading.
Conner, Joseph P., Fowlersburg.
Crans, Samuel M., Williamsport.
Campbell, John R., Williamsport.
Clark, James, Williamsport.
Clay, M. L., Williamsport.
Coleman, Fletcher, Williamsport.
Canfield, Ezra, Williamsport.
Campbell, E. B., Jersey Shore.
Cummings, R. D., Bellefonte.
Claydon, William, Pine Grove.
Cramer, Jacob, Uniontown.
Carter, William N., Jersey Shore.
Coryell, John B., Williamsport.
Crawford, A. S., Williamsport.
Colton, Henry, Williamsport.
Coder, N. B., Williamsport.
Capron, E. W., Williamsport.
Calvin, Otts P., N. Y. City, 234 Broadway.
Carpenter, E. P., Pittsburg.
Cummings, A. B., Philadelphia.
Charles, J. S., Pittsburg.
Cluly, William, Pittsburg.
Coburn, J. P., Aaronsburg, Centre co.
Crawford, M. H., Philadelphia.
Child, S. S., Harrisburg.
Commings, Charles, Harrisburg.
Colestock, Jacob M., Harrisburg.
Colestock, Samuel H., Harrisburg.
Cassel, Jacob, Harrisburg.
Crisswell, J. Vance, Harrisburg.
Coover, John B., Mechanicsburg.
Cameron, J. D., Harrisburg.
Chrisman, R. R., Harrisburg.
Callahan, George, Philadelphia.
Connelly, John, Hyde Park.
Darlington, J. Lacy, West Chester.
Davis, Atlee G., Philadelphia.
Dettry, Henry F., Philadelphia.
Dickey, E. V., Oxford.
Derbyshire, A. J., Philadelphia.
Durar, Enoch, Philadelphia.
Dallett, John, Philadelphia.
Devereaux, John, Philadelphia.
Devereaux, James, Philadelphia.
Deal, Daniel, Philadelphia.
Dasher, David, Harrisburg.
Drinker, H., Montrose.
Driesbach, Daniel G., Beach Haven.
Davis, William L., Easton.
Dœbler, V. S., Williamsport.
Dunlap, H. E., Newberry.
Davis, John L., Newberry.
Du Bois, John, Williamsport.
Datesman, Robert, Milton.
DeHaven, Jehu, Harrisburg.
Dempster, Robert, Phillipsburg, N. J.
Duncan, J. L., M. D., Pittsburg.
Demees, John, Shamokin.
Darlington, H., Pittsburg.
Davis, Joseph H., Pittsburg.
Dull, J. J., Harrisburg.
Dougherty, James D., Harrisburg.
Dougherty, Daniel, Harrisburg.
Deitz, George A., Chambersburg.
DuBarry, J. N., Harrisburg.
Eli, Richard E., Philadelphia.
Evans, David, Philadelphia.
Edwards, William A., Philadelphia.
Ellis, William, Philadelphia.
Evans, John, York.
Elwyn, A. L., Philadelphia.
Eby, Jacob R., Harrisburg.
Eichbaum, William, Pittsburg.
Eberly, Christian, Cumberland.
Everhart, J. T., Pittston.
Engle, Charles K., Bustleton.
Ellis, B. Morris, Hugesville.
Earley, Martin, Palmyra.
Eddy, George W., Philadelphia.
Ensworth, L. A, Williamsport.
Eves, George S., Williamsport.
Embick, Frederick E., Williamsport.
Eldred, Charles D., Williamsport.
Elder, Mathias, Williamsport.
Edwards, Charles, Williamsport.
Elliott, William G., Williamsport.
Eveland, S. D., Williamsport.
Evender, Thomas, Williamsport.
Epes, William J., Williamsport.
Elser, D. B., Williamsport.
Eckert, Isaac, Reading.
Evans, Robert, Erie.
Ever, Andrew, Muncy.
Elder, James, (Swatara,) Harrisburg.
Elliott, B. A., Pittsburg.
Elliott, W. R., Pittsburg.
Estep, J. P., Pittsburg.
Etter, B. F., Harrisburg.
Emminger, John, Hogestown.
Early, D. S., Hummelstown.
Egle, W. H., M. D., Harrisburg.
Ensminger, J. T., Harrisburg.
Emminger, W. H., Harrisburg.
Edwards, Oliver, Harrisburg.
Fager, George C., Harrisburg.

Freas, P. R., Germantown.
Frantz, Jacob, Mount Hope, Lancaster co.
Fotterall, Stephen G., Philadelphia.
Foster, Frank T., Philadelphia.
Fales, George, Philadelphia.
Fallon, Christ'r U., Darby, Delaware co.
Flenniken, J. C., Waynesburg, Greene co.
Felton, S. M., Philadelphia.
Fulton, Andrew, Pittsburg.
Firmstone, William, Easton.
Fleming, Robert, Williamsport.
Fessler, Philip, Williamsport.
Foresman, Robert M., Williamsport.
Fisher, John S., Williamsport.
Forseman, D. W., Williamsport.
Foresman, John, Williamsport.
Foresman, Daniel F., Slifer, Union co.
Forseman, R. S., Williamsport.
Fuller, J. W., Montoursville.
Farrell, John, Pittsburg.
Fass, G., Allegheny city.
Frisch, B., Harrisburg.
Fisler, J. E., Harrisburg.
Fisler, Amos, Harrisburg.
Fleming, Dr. James, Harrisburg.
Flickinger, Samuel, Harrisburg.
Fisher, John R., Harrisburg.
Fox, Richard, Hummelstown.
Feeman, Valentine, Harrisburg.
Fellowes, J. Turney, Scranton.
Fiske, A. R., Harrisburg.
Gowen, James, Mount Airy, Philadelphia.
Grout, H. T., Philadelphia.
Gries, John M., Philadelphia.
Grigg, John, Philadelphia.
Grigg, John Warner, Philadelphia.
Glass, Alexander F., Philadelphia.
Garber, Jacob B., Columbia.
Gillespie, James, Philadelphia.
Gould, J. E., Philadelphia.
Gross, Daniel W., Harrisburg.
Gilbert, Henry, Harrisburg.
Gardner, Jacob, Pittsburg.
Goe, John S., Brownsville.
Goe, John S., Jr., Brownsville.
Gould, Stephen, Williamsport.
Gould, John, Luzerne co.
Gehr, D. O., Chambersburg.
Garis, David, Easton.
Gilmore, Joseph, Williamsport.
Grier, James, Newberry.
Gibson, C. E., Williamsport.
Gould, Robert S., Williamsport.
Gibson, John, Williamsport.
Garman, Samuel, Williamsport.
Gould, Alexander S., Hickory Run, Lycoming co.
Gregg, Theodore, Bellefonte.
Guernsey, H. A., Philadelphia.
Gaynor, Edward J., Easton.
Greenawalt, Alex., Allegheny city.
Glenn, John McDonald, Pittsburg.
Glenn, Robert W., Noblestown.
Grove, M. M., Harrisburg.
Gohl, A., Harrisburg.
Garman, John, Hyde Park.
Griffin, Henry, Scanton.
Germyn, John, Rushdale.
Gibbs, J. W., M. D., Hyde Park.
Gregory, J. W., Scranton.
Griest, Chas. W., York Sulphur Springs.
Hammond, John W., Erie.
Haldeman, Jacob S., New Market.
Heister, A. O., Harrisburg.
Hutchinson, J. Pemberton, Philadelphia.
Hickok, W. O., Harrisburg.
Hacker, William, Philadelphia.
Harvey, Chalkey, Chaddsford.
Haseltine, John, Philadelphia.
Hart, William H., Philadelphia.
Hoopes, Thomas P., Philadelphia.
Hamilton, A. Boyd, Harrisburg.
Hoffman, H. W., Harrisburg.
Haldeman, Jacob M., Harrisburg.
Haddock, D., Jr., Philadelphia.
Hall, George E., Philadelphia.
Hiester, F. A. M., Reading.
Haehnlen, Frederick, Harrisburg.
Hoffer, John, Harrisburg.
Hamilton, Hays, Huntingdon Furnace.
Haldeman, S. S., Columbia.
Hicks, James, Pittston.
Hutchins, Thomas, Wyoming.
Harvey, E. B., Wilkesbarre.
Hollenback, George M., Wilkesbarre.
Hitner, Henry S., Barren Hill.
Holstein, Wm. H., Bridgeport.
Hartranft, Samuel E., Norristown.
Haehnlen, Jacob, Harrisburg.
Hackett, J. M., Easton.
Hetrich, Josiah P., Easton.
Hutter, Wm. H., Easton.
Hartman, John, Williamsport.
Hartman, Mathias, Catawissa.
Herdic, Peter, Williamsport.
Hill, Theodore, Williamsport.
Hall, John B., Williamsport.
Hudson, Joseph E., Williamsport.
Hagerman, Augustus H., Williamsport.
Heidler, David, Williamsport.
Holden, H. L., Williamsport.
Hays, J. W., Williamsport.
Huling, Louis G., Williamsport.
Hinkle, John R., Newberry.

Higgins, William C., Williamsport.
Huyck, George, Newberry.
Hull, Joseph F., Hull's Mill.
Hepburn, Andrew, Williamsport.
Harrington, Thomas L., Williamsport.
Heylmun, E. G., Crescent, Lycoming co.
Howel, A., Williamsport.
Howland, Rausford, Williamsport.
Hastings, H. S., Williamsport.
Holliday, B. B., Wellsboro'.
Hepburn, John, Williamsport.
Hagy, Philip, Williamsport.
Hull, W. R., Cogan Station.
Hise, Adam, Williamsport.
Hamilton, Cyrus E., Williamsport.
Hoffman, Philip, Williamsport.
Hester, Joseph M., Easton.
Helick, Reuben, Easton.
Higgins, William V., Williamsport.
Hemingway, E. E., Easton.
Hugus, P., Pittsburg.
Hale, James P., Osceola, Clearfield co.
Higgins, William V., Williamsport.
Herr, Henry, Harrisburg.
Hummel, Richard H., Harrisburg.
Hummel, William, Harrisburg.
Hickman, Amos S., Monticello, Illinois.
Hynicka, George, Harrisburg.
Hummel, S. A., Harrisburg.
Haehnlen, William F., Harrisburg.
Hamilton, Hugh, Harrisburg.
Hargest, William E., Harrisburg.
Hostic, John, Harrisburg.
Herr, D. S., Harrisburg.
Hummel, Alfred, Haarisburg.
Hall, John W., Harrisburg.
Heck, Lewis, M. D., Dauphin.
Hamilton, T. A.. Harrisburg.
Hain, George, Lower Paxton, Dauphin co.
Hoffman, H. B., Millersburg.
Hunter, George W., Harrisburg.
Hutchinson, J. W., Harrisburg.
Hildrup, W. T., Harrisburg.
Halstead, N. Scranton.
Hill, J. F., Scranton.
Halstead, W. F., Scranton.
Ingersoll, Harry, Philadelphia.
Irwin, James, Philadelphia.
Innis, John A., Easton.
Jordan, John, Philadelphia.
Jefford, A. M., Wyoming.
Jenkins, G. S., Wyoming.
Jenkins, Steuben, Wyoming.
Jones, Daniel, Exeter, Luzerne county.
Jessup, William H. Wilkesbarre.
Jackson, George D., Dushore, Sullivan county.
Johnston, William, Easton.
Jones, John E., Williamsport.
Jarrett, John, Hepburn, Lycoming co.
Jones, Samuel, Williamsport.
Jamison, Edward, Newberry.
Jamison, L. Williamsport.
Jeter, Tinsley, Bethlehem.
Jones, B. F., Pittsburg.
Jordan, Thomas J., Harrisburg.
Knapp, Amos E., Northumberland.
Kramer, Philip, Philadelphia.
Keim, George M., Reading.
Knight, William H., Philadelphia.
Kimball, Stephen, Philadelphia.
Kelly, Charles, Kellyville, Delaware co.
Knox, Thomas P., Norristown.
Knight, Edward C., Philadelphia.
Keller, John S., Orwigsburg.
Kunkle, Benjamin S., Harrisburg.
Knapp, D. B., Williamsport.
King, C. M., White Deer Mills, Centre co.
Kinyon, S. C., Williamsport.
Kunsman, William H., Easton.
Kelly, Dennis, Kellyville, Delaware co.
King, Alexander, Pittsburg.
Kreybill, Jacob E., Marietta.
Knipe, Joseph F., Harrisburg.
Koller, Henry M., Harrisburg.
Kuhn, William, Harrisburg.
Keely, Jerome, Union Deposit, Dauphin county.
Kirby, William C., Harrisburg.
Kepple, John, Harrisburg.
Kirkpatrick, J. D., North Liberty, Mercer county.
Kelker Immanuel, Harrisburg.
Lukenbaugh, Chas. Augustus, Bethlehem,
Longstreth, John, Bristol.
Lauman, George M., Harrisburg.
Lauguerrene, P. L., Philadelphia.
Lancaster, J. B., Philadelphia.
Linn, Philip, Harrrisburg.
Lafrance, Isaac T., Wyoming.
Lee, Washington, Jr., Wilkesbarre.
Leacock, J. R., Wyoming.
Longaker, A. Brower, Norristown.
Line, J. M., Allentown.
Lawell, Edward, Easton.
Lerch, Frederick, Easton.
Logan, Millard F., Williamsport.
Lowe, Ellis S., Williamsport.
Love, Samuel, Williamsport.
Lyon, Thomas, Williamsport.
Lippencott, Edward, Williamsport.
Lentz, George W., Williamsport.
Lehman, M., Williamsport.
Levan, E. M. D., Williamsport.

Long, Henry B., Pittsburg.
Long, W. J., Osceola, Clearfield co., Pa.
Lamberton, Robert A., Harrisburg.
Lauer, Fred'k W., Reading.
Marvin, Seldon, Erie.
McAllister, H. N., Bellefonte.
Marshall, William, Bellefonte.
Meredith, James M., West Chester.
McKinley, Isaac G., Harrisburg.
Miles, James, Girard, Erie county.
McIlvaine, Abram R., Brandywine Manor, Chester county.
McGowen, John, Bridesburg, Philadelphia.
Murdock, John, Jr., Pittsburg.
Myers, Joseph B. Philadelphia.
Mellor, Thomas, Philadelphia.
Mellon, Thomas, Philadelphia.
Magee, James, Philadelphia.
McCully, Francis G., Philadelphia
Messchart, H., Philadelphia.
McKean, H. P. Philadelphia.
McKean, Samuel M., Williamsport.
Martin, George H., Piladelphia.
McCrea, William H., Philadelphia.
McIntyre, Peter, York.
McFarland John, Ligonier.
Middleton, E. P., Philadelphia.
Magee, George, Philadelphia.
Muhlenberg, H. H., Reading.
McDowell, John, Washington.
Murray, Wm. F., Harrisburg.
McAllister, Archibald, Springfield Furnace, Blair county.
Metzgar, Wm., Harrisburg.
Murdock, A. C., Pittsburg.
Merrick, George, Northumberland.
McAllister, John C., Fort Hunter, Dauphin county.
Maxwell, Henry D., Easton.
Myers, Henry, Forty Fort.
Marcy, Ira, Wilkesbarre.
McCrea, James A., Philadelphia.
Martin, Dewees J., Allentown.
Mutchler, John, Easton.
McMinn, J. M., Williamsport.
Mudge, Hiram, Williamsport.
Munday, J. S., Williamsport.
McLowell, Lewis, Williamsport.
McCormick, Robert, Montoursville.
Moore, Wesley, Newberry.
Mahaffey, David, Cogan Station.
Mahaffey, Lindsey, Newberry.
McMicken, J. B., Williamsport.
Miller, Larr, Wayne, Clinton county.
Mahaffey, William J., Newberry.
Maxwell, Jacob S., Williamsport.
Morse, H. S., Williamsport.
Montgomery, J. B., Williamsport.
Munday, H. F., Williamsport.
Morrison, S. G., Williamsport.
Morris, John C., Friendsville.
McCauley, George W., Harrisburg.
Messinger, Samuel, Easton.
McCain, Daniel, Allegheny city.
McKelvey, James, Wilkinsburg, Allegheny county, Pa.
Morris, D. B., Pittsburg.
McPherson, J. S., Wilkins.
McNish, A. L., Pittsburg.
Marchand, John, Pittsburg.
Magan, David, New Brighton, Beaver co.
McFarland, John, Northumberland.
Montgomery, Joseph, Harrisburg.
Motter, John, Harrisburg.
Mark, Geo. M., Harrisburg.
Middleton, Richard, Harrisburg.
Miller, Wm. H., Harrisburg.
Mumma, David, Harrisburg.
McFarland, Geo. F., Harrisburg.
McConkey, Elbridge, Harrisburg.
McDonald, Lewis, Harrisburg.
McCormick, David, Harrisburg.
Miller, J. G., Harrisburg.
McCormick, James, Harrisburg.
Morse, L W., Ledgedale, Wayne co.
Newbold, A. T., Philadelphia.
Neilson, Robert, Philadelphia.
Neff, Robert K., Philadelphia.
Newton, G. B., Springfield, Delaware co.
Noble, John, Carlisle.
Noble, F. W., Easton.
Nissley, John J., Hummelstown.
Nicely, George W., Newberry.
Nutting, Lyman, Pine Grove, Schuylkill county.
Nichols, Joseph, Williamsport.
Nichols, W. F., Williamsport.
Neilman, D. H., Easton.
Nissley, Joseph, Harrisburg.
Opp, George S., Mayland, Lycoming co.
Osthout, Jacob H., Harrisburg.
Odenwelder, Henry L., Easton.
Olwine, Benjamin, Harrisburg.
Ott, Leander N., Dauphin co.
Packer, William F., Williamsport.
Pritchett, Borradaile, Frazier, Chester co.
Perot, W. S., Philadelphia.
Pennock, Samuel, Kennet Square, Chester county.
Pratt, Thomas, Philadelphia.
Pomeroy, John L., Philadelphia.
Peyson, Augusta, Philadelphia.
Patterson, Robert, Philadelphia.

Physic, Emlen, Philadelphia.
Presbury, Geo. G., Jr., Philadelphia.
Priestly, J. R., Northumberland.
Parsons, H. K., Harrisburg.
Peters, Benjamin G., Harrisburg.
Pennock, Joseph, Pittsburg.
Patterson, Robert H., Pittsburg.
Powell, Robert H., Philadelphia.
Paxton, Joseph, Catawissa.
Polen, Albert, Wyoming.
Peters, C. P., Concordsville.
Potts, E. Channing, Norristown.
Parsons, Leroy, Harrisburg.
Pyle, R. C., Easton.
Purcell, Sylvester, Bloomsburg.
Parsons, Henry C., Williamsport.
Piatt, John, Williamsport.
Pollock, Samuel, Williamsport.
Porter, John F., Newberry.
Parker, Samuel J., Williamsport.
Perkins, H. J., Williamsport.
Perkins, James H., Lemar.
Page, A., Williamsport.
Post, G. S., Williamsport.
Parke, John E., Pittsburg.
Patterson, Lebanon Church, Allegh'y co.
Phelps, W. H., Pittsburg.
Pemberton, Clifford, Pittsburg.
Phillips, John, Pittsburg.
Power, John, Harrisburg.
Parsons, George W., Harrisburg.
Rogers, C. B., Philadelphia.
Roberts, Algernon S., Philadelphia.
Rutherford, John P., Harrisburg.
Rice, John, Philadelphia.
Rice, William, Philadelphia.
Roberts, Isaac, Norristown.
Rudman, William C., Philadelphia.
Robeson, H. P., Robesonia, Berks co.
Rodgers, Fairman, Philadelphia.
Rhodes, William A., Philadelphia.
Ripka, Joseph, Philadelphia.
Remington, Thomas P., Philadelphia.
Ronaldson, Richard, Philadelphia.
Reif, C. P., Philadelphia.
Rutherford, S. S., Harrisburg.
Rutherford, Abner, Harrisburg.
Reily, John A., Harrisburg.
Robb, Jacob, Pittsburg.
Robinson, ——, Philadelphia.
Rutter, Nathaniel, Wilkesbarre.
Ross, Wm. S., Wilkesbarre.
Rutherford, John B., Harrisburg.
Ruggles, A. C., Williamsport.
Rutherford, W. F., Paxton.
Reighard, James B., Newberry.
Reighard, Daniel, Newberry.
Renninger, W. H., Williamsport.
Rook, D. N., Williamsport.
Rank, L. D., Williamsport.
Rouse, William A., Harrisburg.
Reed, Alexander, Lock Haven.
Rodenbough, Joseph S., Easton.
Reeder, Mrs. A. H., Easton.
Richards, Henry, Easton.
Reigel, Joseph, Easton.
Roth, Jeremiah, Allentown.
Rogers, Felix, Pittsburg.
Rowley, Thomas A., Pittsburg.
Russell, Alex. L., Harrisburg.
Rogers, Lucius, Smethport, McKean co.
Raymond, James, Harrisburg.
Reel, Augustus, Harrisburg.
Rutherford, William S., Harrisburg.
Reel, John, Harrisburg.
Reed, James, Middle Paxton, Dauphin co.
Reichenbach, E. C., Harrisburg.
Rudy, Joseph, Harrisburg.
Rupp, Henry S., Shiremanstown, Cumberland county.
Rutherford, J. E., Harrisburg.
Rhey, Geo., Millwood, Westmoreland co.
Richmond, William H., Carbondale.
Rand, George W., Scranton.
Reed, E. W., Erie.
Savery, Peleg B., Philadelphia.
Stambaugh, S. C., Lancaster.
Sergeant, William, Philadelphia.
Strouble, Jacob, Zion, Centre county.
Snow, Edward K., Philadelphia.
Sharp, Joseph W., Philadelphia.
Stavely, Wm., Lahaska, Bucks co.
Smith, Daniel, Jr., Philadelphia.
Smith, Thomas, Philadelphia.
Scull, Gideon, Philadelphia.
Silverthorn, M. H., Fairview, Erie co.
Simmons, A. H., Philadelphia.
Starr, Isaac, Philadelphia.
Shoemaker, B. A., Philadelphia.
Schaffer, W. L., Philadelphia.
Smith, Geo., Upper Darby, Delaware co.
Sheridan, Owen, Philadelphia.
Speer, William, Pittsburg.
Spencer, S. S., Lancaster.
Swift, Joseph, Philadelphia.
Struthers, William, Philadelphia.
Slade, Alfred, Philadelphia.
Stuart, George H., Philadelphia.
Small, Samuel, York.
Sharwood, Dendy, Philadelphia.
Stone, Daniel, Philadelphia.
Speer, Alexander, Pittsburg.
Stokes, William A., Greensburg.
Sturdevant, E. W., Wilkesbarre.

Shoemaker, Wm. M., Wyoming.
Sturdevant, E. J., Wyoming.
Speece, L. B., Wyoming.
Smith, J. B., Dunmore.
Shoemaker, Wm. S., Wyoming.
Schooley, J. B., Wyoming.
Smith, J. B., Plymouth.
Shoemaker, Elijah, Kingston.
Sharp, John. Jr., Wyoming.
Stark, J. B., Wilkesbarre.
Stephens, Z., Scranton.
Sower, F. D., Norristown.
Schall, David, Norristown.
Schreiber, O. L., Laubach, North'ton co.
Sigman, Joseph, Easton.
Snyder, Daniel W., Easton.
Schreiner, J. W., Lewisburg.
Singer Manufacturing Co., Philadelphia.
Swan, Rufus C., Williamsport.
Sheffler, A. G., Williamsport.
Smith, Henry B., Williamsport.
Smith, Joseph W., Newberry,
Stearns, L. L., Williamsport.
Stewart, Robert, Lemar.
Showers, Jesse, Rauch Gap.
Smith, Thomas, Williamsport.
Showers, D. H., Williamsport.
Smith, Daniel W., Williamsport.
Saxton, J. O., New Kingston.
Shaw, Hugh, Jersey Shore.
Smith, J. D. L., Mill Hall.
Seltzer, George L., Myerstown.
Seitz, George, Easton.
Seitz, Frederick, Easton.
Serch, David, Easton.
Scott, John, Pittsburg.
Sharpless, S. J., Street Road, Chester co.
Smith, George, New York city.
Seiler, Daniel W., Harrisburg.
Shoemaker, John, Harrisburg.
Scheffer, Theodore, Harrisburg.
Smith, Jacob, Harrisburg.
Shaffer, William S., Harrisburg.
Simon, John B., Harrisburg.
Smull, John A., Harrisburg.
Shellenberger, Henry, Harrisburg.
Scott, George, Catawissa.
Sharp, Samuel W., Newville.
Sheck, J. H., Harrisburg.
Silkman, Wm. M., Scranton.
Thompson, John I., Half Moon, Centre co.
Thomas George, Belvidere, Chester co.
Thatcher, Richard, Marsh, Chester co.
Toppan, Charles, Philadelphia.
Thompson, N. B., Philadelphia.
Tatham, H. B., Philadelphia.
Tatham, George N., Philadelphia.
Towers, William H., Philadelphia.
Taggart, David, Northumberland.
Taggart, John, Northumberland.
Tasker, Thomas T., Philadelphia.
Tripp, Ira, Scranton.
Trout, Michael C., Sharon, Mercer co.
Tyson, Carrol S., Norristown.
Thomas, Henry, Harrisburg.
Templin, James R., Easton.
Taylor, Benjamin H., Williamsport.
Taylor, Horace E., Williamsport.
Thompson, James, Cogan Station.
Trump, Edward D., Jersey Shore.
Tinsman, Garrett, Williamsport.
Tinseley, Peter, Bethlehem.
Thayer, Russell A., Allentown.
Templin, William, Harrisburg.
Taylor, William, Womelsdorf, Berks co.
Taylor, B. Frank, Womelsdorf.
Taylor, George R., Womelsdorf.
Tracy, John A., Erie.
Urquehart, John, Wilkesbarre.
Updegraff, A., Wilkesbarre.
Updegraff, Thomas, Newberry.
Updegraff, Daniel, Newberry.
Updegraff, Derrick, Newberry.
Unger, David J. Harrisburg.
Unger John G., Harrisburg.
Van Leer, Isaac W., Wallace, Chester co.
Vouges, James C., Philadelphia.
Vanvoorhis, H. B. Pittsburg.
Vanscoy, Daniel Wyoming.
Van Vorce, John, Williamsport.
Van Buskirk, S., Williamsport.
Vandike, James, Northumberland.
Walker, George, Montrose.
Watts, Frederick, Carlisle.
Walker, R. C., Elizabeth, Allegheny co.
Wood, Robert, Philadelphia.
Waterman, Joseph, Philadelphia.
Wister, Richard, Philadelphia.
Watson, Johanna, Philadelphia.
Welsh, William, Philadelphia.
Welsh, John, Philadelphia.
Welsh, Samuel Philadelphia.
Woodward, George W., Philadelphia.
Weaver, H. A., Pittsburg.
Wright, Joshua, Washington co.
Watson, A. W., Harrisburg.
Walters, S. H., Northumberland.
Wright, Joshua, Findleyville, Washington county.
Waterman, Albert G., Philadelphia.
Wood, Thomas, Penningtonville.
Woodhams, Samuel, Plymouth.
Williams, Stiles, Wilkesbarre.
Wright, H. B., Wilkesbarre.

Wetherill, William, Norristown.
Wentz, Thomas H., Norristown.
Whitman, Joseph, Centre Valley P. O.
Williams, E. C., Harrisburg.
Woodward, John V., Williamsport.
Watson, Oliver, Williamsport.
White, Henry, Williamsport.
Wolf, Peter, Williamsport.
Wingard, Samuel C., Williamsport.
Watson, Henry W., Williamsport.
Weaver, M. B., Williamsport.
White, John, Williamsport.
Wait B., Williamsport.
Wood, James M., Williamsport.
Westcott, Thos., S., Ashland, Schuylkill county,
Ward, C. L., Towanda.
Workheiser, Enos, Easton.
Wallace, W. W., Pittsburg.
Withington, W. P., Shamokin.
Way, John, Jr., Pittsburg.
White, J. A. G., Osceola, Clearfield co.
Wallower, John, Harrisburg.
Winters, George, Harrisburg.
Wolfinger, Levi, Harrisburg.
Wible, William, Gettysburg.
Watts, William M., Mechanicsburg.
Warford, A. B., Harrisburg.
Wolf, William, Harrisburg.
Wilhelm, A., Cornwall.
Walker, John H., Erie.
Waggoner, John A., Harrisburg.
Yeager, Joseph, Philadelphia.
Young, Alexander, Philadelphia.
Yeaton, William H., Philadelphia.
Youngman, George W., Williamsport.
Young, William, Easton.
Young, John, Jr., Ewing's Mills, Allegheny county.
Young, James, Middletown.
Zeigler, John H., Harrisburg.
Zimmerman, F., Williamsport.
Zimmerman, A. M., Harrisburg.
Zerbe, Cyrus, Harrisburg.

OFFICERS

OF THE

PENNSYLVANIA STATE AGRICULTURAL SOCIETY,

FOR 1877.

PRESIDENT.

John W. Hammon, Erie, Erie county.

VICE PRESIDENTS BY CONGRESSIONAL DISTRICTS.

1. James A. McCrea, Philadelphia.
2. George Blight, Philadelphia.
3. A. L. Kennedy, Philadelphia.
4. William S. Bissell, Pittsburg.
5. A. D. Levering, Philadelphia.
6. David H. Branson, Coatesville, Chester county.
7. William H. Holstein, Bridgeport, Montgomery county.
8. Tobias Barto, Reading, Berks county.
9. S. S. Spencer, Lancaster, Lancaster county.
10. Daniel H. Nieman, Easton, Northampton county.
11.
12. Ira Tripp, Scranton, Luzerne county.
13. J. S. Keller, Orwigsburg, Schuylkill county.
14. John A. Smull, Harrisburg, Dauphin county.
15. James E. Carmalt, Friendsville or Montrose.
16. J. B. Potter, Wellsboro', Tioga county.
17. S. Baker, Altoona, Blair county.
18. John S. Miller, Huntingdon, Huntingdon county.
19. Daniel O. Gehr, Chambersburg, Franklin county.
20. L. A. Mackey, Lock Haven, Clinton county.
21. George Rhey, Millwood, Westmoreland county.
22. John Murdoch, Jr., Pittsburg, Allegheny county.
23. W. W. Speer, Pittsburg, Allegheny county.
24. Jno. McDowell, Washington county.
25. J. B. Lawson, Reimersburg, Clarion county.
26. J. D. Kirkpatrick, N. Liberty, Mercer county.
27. Thomas J. Edge, Chester county.

ADDITIONAL MEMBERS EXECUTIVE COMMITTEE.

A. Wilhelm, Cornwall, Lebanon county.
Abner Rutherford, Paxton, Dauphin county.
William Taylor, Womelsdorff, Berks county.
R. C. Allen, Mercer, Mercer county.
John H. Ziegler, Harrisburg, Dauphin county.

EX-PRESIDENTS, MEMBERS OF THE BOARD.

Frederick Watts, Carlisle, Cumberland county.
D. Taggart, Northumberland, Northumberland county.
Jacob S. Haldeman, Harrisburg, Dauphin county.
Thomas P. Knox, Norristown, Montgomery county.
A. Boyd Hamilton, Harrisburg, Dauphin county.
Amos E. Kapp, Northumberland, Northumberland county.
John C. Morris, Friendsville, Sushuehanna county.
J. R. Eby, Harrisburg, Dauphin county.

RECORDING SECRETARY.

D. W. Seiler, Harrisburg, Dauphin county.

TREASURER.

John B. Rutherford, Harrisburg, Dauphin county.

CORRESPONDING SECRETARY.

Elbridge McConkey, Harrisburg, Dauphin county.

LIBRARIAN.

William H. Egle, M. D., Harrisburg, Dauphin county.

CHEMIST AND GEOLOGIST.

S. S. Haldeman, Columbia, Lancaster county.

ASSISTANT CHEMIST AND GEOLOGIST.

Hugh Hamilton, Harrisburg, Dauphin county.

MINUTES OF THE EXECUTIVE COMMITTEE.

HARRISBURG, *January 16, 1877*

The Executive Committee met at 2 o'clock, P. M.

The following members present: Messrs. McCrea, Kennedy, Levering, Holstein, Barto, Spencer, Neiman, Conner, Tripp, Smull, Gehr, Rhey, Murdoch, Jr., Lawson, Kirkpatrick, Rutherford, Keller, Knox, A. B. Hamilton, Kapp, Morris, Eby, McConkey, J. B. Rutherford, Hugh Hamilton, Egle, and Seiler.

The minutes of the meetings of the Society, Executive Committee, and also the Sub-Executive for the year 1876 were read and approved.

On motion of Mr. Rhey, James A. McCrea was elected to act as president, (on account of the death of the Hon. George Scott, the late presiding officer,) until another presiding officer is elected.

Mr. Knox, chairman of the committee appointed to memorialize the Legislature relative to the passage of an act for the protection of sheep, submitted a verbal report, and ask that the committee be continued.

Agreed to.

Messrs. Murdoch, Conner, and A. Boyd Hamilton were appointed a committee to prepare resolutions relative to the death of Messrs. Scott, Speer, and Peters, late members of this committee.

The President appointed Messrs. Kirkpatrick, Eby, and Kapp a committee to audit the accounts of the Treasurer.

Also, Messrs. Abner Rutherford, Tripp, and Barto, as judge and tellers, to conduct the election, (January 17, 1877.)

The committee appointed to draft resolutions relative to the death of deceased colleagues, reported as follows:

The Executive Committee of the Pennsylvania State Agricultural Society, on behalf of the whole Society, is called upon to express profound regret at the loss, by death, of three of its members—one of whom was its highest officer—all of them active, prominent, and intelligent members of this committee, and all called away from the pursuits of life since our last meeting. It is, therefore, our duty, upon this occasion, to express the sincere sorrow we feel at this unusual bereavement.

Mr. George Scott, of Columbia county, previous to his election as president of this Society, in 1875, had filled with credit many important public positions. During his administration of our affairs, no word of complaint was heard. Often they are troublesome, and happy the incumbent who escapes censure. The duty imposed upon our late colleague was so prudently performed and so efficiently discharged as to win the praise of all with whom he came into contact. He gave his time and means with liberality to further the success of this Society.

Mr. Alexander Speer, of Allegheny county, was chosen a vice president in 1874. A gentleman largely engaged in manufactures, modest in the expression of his unusually correct views, popular and courteous in intercourse with his colleagues, and attentive and earnest in the performance of his duties, the loss of a gentleman of his high character is greatly to be deplored.

Mr. Benjamin G. Peters, of Dauphin county, was for a long period a member of the Executive Committee. Always prompt and energetic in the discharge of any trust assigned to him, a decided yet courteous counsellor, he was called away in the midst of an active and prosperous business career, by a sudden and shocking accident. His loss is most regretted by those who know him best—a tribute of the highest character. This Executive Committee, therefore,

Resolve, That this expression of regret at our loss be entered on the minutes of the Society, and that copies of it, under the seal of the Society, signed by the President and Secretary, be transmitted to the representatives of the families of Messrs. Scott, Speer, and Peters.

Agreed to unanimously by a rising vote.

Mr. Murdock presented the following:

Mr. President: It becomes my painful duty to have to inform this Society that, since its last meeting, one of the members of the Executive Committee, Alexander Speer, of Pittsburg, is now no more, having died May 12, 1875. For many years associated with Mr. Speer as manager of the Allegheny County Agricultural Society, and from a long personal acquaintance with him, I feel that a truly upright and good man is gone; and I feel that Pittsburg, where his genius, his enterprise, and his worth was so well known, together with the Executive Committee of this Society, of which he was an honored member, will long mourn his loss.

Mr. Rhey moved that when this Committee adjourn it be to meet at 7½ o'clock this evening.

Agreed to.

Mr. Knox offered the following:

Resolved, That a committee of three be appointed to ascertain whether a suitable room can not be obtained at a much less rent than the one now occupied by this Committee.

Agreed to.

The Chair appointed Messrs. Eby, Abner Rutherford, and Seiler said committee.

The report of the Sub-Executive Committee, appointed January 19, 1876, to whom was referred all matters relating to disputed premiums, and all other subjects relating to and effecting the interests of the Society, &c., made a full explanation of their duties and expenditures, which, upon motion of Mr. Barto, was accepted and confirmed.

Mr. McCrea, as chairman of the committee to whom was given the power to offer such premiums as in their judgments may best conduce to the interests of agriculture, and maintain the credit of the Society, in behalf of the Centennial Exposition, at Philadelphia, desired to inform the Executive Committee that, after consultation with B. Landreth, Chief of the Bureau of Agriculture, the committee agreed to award ten premiums of one hundred dollars each. These premiums were published. Up to this time the judges and committees on the several awards have not made any report, and until this is done no premiums can be paid.

On motion, the committee were requested to report, in writing, at the next meeting.

Agreed to.

Mr. Smull offered the following:

Resolved, That a committee of three be appointed, whose duty it shall be to examine what legislation exists in other States, not found in ours, upon the subject of agriculture—such as fences, roads, etc., and other matters interesting to farmers, and make report to this Society.

The Chairman appointed Messrs. Smull, Kennedy, and Egle said committee.

The following resolution was presented:

Resolved, That the tender made by the *Practical Farmer*, a publication issued in Philadelphia in the interest of agriculture, to publish the proceedings of this Society and other matters of interest in a condensed form, is thankfully accepted, and that the Secretary be requested to furnish the same.

On motion, adjourned until seven o'clock P. M.

HARRISBURG, *January 16, 1877.*
7½ O'CLOCK, P. M.

The Committee was called to order. This being the time agreed upon by the Committee for the discussion of the amendment proposed to be added to the act creating the State Board of Agriculture, Mr. Rhey moved to strike out all after the words "State Agricultural College," in the fourth line, and insert "The Executive Committee of the Pennsylvania State

Agricultural Society;" also, strike out all after the first section as amended, and insert:

"SECTION 1. *Be it enacted, &c.*, That the Secretary of Internal Affairs of the Commonwealth of Pennsylvania be, and he is hereby, authorized and required, as soon after the passage of this act as possible, to establish in his department a bureau of agriculture and statistics.

"SECTION 2. He shall appoint a competent person to take charge of the business of said bureau, at a salary of $——— per annum, who shall be styled the 'Superintendent of Agriculture and Statistics.'

"SECTION 3. Said superintendent shall at once prepare to have an accurate enumeration, annually, hereafter, of all the inhabitants of the State, giving their age and occupation. He shall provide for the collection, at the same time by the same persons, of all statistics relating to the agricultural, mining, mineral, manufacturing, mercantile, navigation, transporting, and financial interests of the State. These statistics shall furnish the number of persons employed in each branch of industry and business; the amount of capital invested; the amount expended for labor and the amount and value of the produce of their labor. In agriculture, they shall set forth the number of acres respectively cultivated in each description of grain, seed, root, fruit, and grass crops; in peas and beans, in hops and in truck or garden crops, the number of bushels, pounds, or tons of each crop, and the entire weight of the produce of the land so occupied; the manner in which the ground was cultivated and fertilized; the number of acres underdrained; the number, age, and sex of all farm stock; the number of acres and cows specially devoted to each class of dairy purposes and the produce, in pounds, of each; the number of each description of farm stock fed for slaughter; the number and weight of each kind slaughtered; the amount, in pounds, of wool of the different kinds clipped, and the number of dogs. He shall also obtain from the other States of this Confederacy and the governments of Europe, all possible information pertaining to the interests of agriculture, and report the same, with the statistics which may be collected in pursuance of this act, to the Secretary of Internal Affairs, each year, so arranged for publication that each branch of industry and business may be distinctly presented.

"SECTION 4. Said superintendent shall prepare suitable blank forms which shall be furnished to the commissioners of each county in this Commonwealth, and by them placed in the hands of the assessors in each township, borough, and ward in the State, who are hereby authorized and required to collect the statistics aforesaid, record them on the blank forms, and return them to the commissioners, who shall immediately forward them to the said superintendent.

"SECTION 5. It shall be the duty of said superintendent to recommend in his annual report to the Secretary of Internal Affairs such laws, amendments to existing laws, and such appropriations of money as he may deem advantageous to and best calculated to promote the interests under his supervision.

"SECTION 6. Said superintendent, with the advice and consent of the Secretary of Internal Affairs, shall be permitted to employ a chemist at a salary not to exceed $——— each year, to make such analysis and examinations as in his opinion may be necessary to accomplish fully the objects proposed by the creation of this bureau, and employ such other assistants as may be necessary to perform all the duties of the same.

"SECTION 7. The Secretary of Internal Affairs shall have the report of said superintendent published each year in convenient form for distribution in sufficient number to disseminate the information among the people of the State."

Mr. Lawson approved portions of the act, but was opposed to other parts, and, therefore, cannot indorse it.

On motion of Mr. McCrea, the further consideration of the matter was postponed for the present.

Dr. Edge, of Chester county, the author of the bill creating the State Board of Agriculture, being present, was requested to express his opinion upon the bill as amended. That gentlemen said he preferred to hear the views of the members of the Executive Committee before he would make any remarks.

Mr. Rhey desired to say that this bill met with the unanimous approval of this committee at the time it was introduced by him, and for years he had urged the matter as one of great importance to the community we represent. This bill brings the matter in such a shape whereby a correct and true report can be had of the production of the soil. The information, once obtained, will be of such value that no member of this committee can estimate, and if a proper effort be made it can be accomplished.

Mr. Holstein desired Mr. Rhey to inform this committee if it was his intention to have this bill presented to the Legislature before the State Board of Agriculture was organized.

Mr. Rhey, in reply, said that the intention was to ask the Legislature to pass this as an amendment.

Dr. Egle thought that this was a matter of vital importance to this Society, and, therefore, moved that it be referred to a committee of five, to report upon the same to-morrow.

Mr. Rhey thought, as the Executive Committee was full, that this was the proper time for a fair and open discussion, and hoped that it would not be referred to the committee. This morning he was at the office of the

Bureau of Statistics, and was informed that there was no law by which the statistics could be collected, and that the person who controlled that branch approved this bill in its present shape; and if passed, it would be the means of giving to the people the information so long wished for.

Dr. Edge, in reply, said the act was framed after the Massachusetts act of 1853, and under it, the board of that State is now one of the most progressive in the country. He never examined the amendment, but from a hasty examination, he thought it impracticable, and that the duty of the Bureau of Statistics would be transferred to this board. The amendment would make the board too large, and, in his opinion, it should be defined and limited.

Mr. Kennedy said he received a copy of the act some time ago, and at present he was not prepared to act. He, therefore, seconded the motion of Dr. Egle.

Which was ageed to.

The President appointed Messrs. Egle, Conner, Rhey, Hamilton, and Kennedy said committee.

Mr. Rhey then read, for the information of the members present, an essay on finance, which was ordered to be printed.

HARRISBURG, *January 17, 1877*, 9 o'clock, A. M.

The Committee was called to order by the President.

The reports of the committee on the bill to amend the act creating the State Board of Agriculture being in order, the following were made:

The committee to whom was referred the amendments proposed to the act passed at the last session of the Legislature establishing a State Board of Agriculture, respectfully report:

That after due consideration of the subject, they recommend the following for the action of this Society:

A supplement to an act to establish a State Board of Agriculture.

SECTION 1. That in addition to the persons designated to form the Board of Agriculture, established in the first section of the act to which this is a supplement, there shall be seven persons, to be chosen by the Executive Committee of the Pennsylvania State Agricultural Society. Said delegates shall be elected yearly, on the third Wednesday of January, and be members of the said Executive Committee.

Respectfully submitted,

WILLIAM H. EGLE,
ALFRED L. KENNEDY,
A. BOYD HAMILTON,
J. P. CONNER,
Committee.

Mr. Rhey offered as a minority report the bill as read by him.

Mr. Murdoch desired to say that the bill, as now in force, excluded from being represented in the Board the county of Allegheny, and he thought the county of Philadelphia, besides other sections of the State. As these two counties contained the largest population, he thought that this bill covered that objection, and he would, therefore, vote for the bill as originally framed.

Mr. Knox also supported the minority report.

Mr. Kirkpatrick thought, in answer to the objection of Mr. Murdoch, that the Board wanted to introduce such changes in the law so as to give all sections of the State a representation. We do not desire to take charge of the matter; but after the Board is organized, we might with propriety make suggestions as to the efficient working of the Board.

Mr. McCrea wished to say that, in his opinion, he believed it would be best to have the Board organize, and afterwards, he thought, that suggestions from this Society would have some weight; and he moved the further consideration of the subject be postponed for the present.

The hour of ten having arrived, the meeting adjourned.

D. W. SEILER,
Recording Secretary.

HARRISBURG, *January 17, 1877*,—10 o'clock, A. M.

The meeting of the Society was called to order, and, on motion of Mr. Seiler, W. H. Holstein was elected chairman.

The Chair announced that the hour fixed by the Constitution having arrived, the officers appointed to conduct the election should take their places.

At 12 o'clock, the Chair announced the polls closed. The judge and tellers then counted the votes, reporting as follows:

PRESIDENT.

JOHN W HAMMOND.

VICE PRESIDENTS.

1. James A. McCrea.
2. George Blight.
3. A. L. Kennedy.
4. William S. Bissell.
5. A. D. Levering.
6. David H. Branson.
7. William H. Holstein.
8. Tobias Barto.
9. S. S. Spencer.
10. Daniel H. Neiman.
11. Joseph P. Conner.
12. Ira Tripp.
13. J. S. Keller.
14. John A. Smull.
15. James E. Carmalt.
16. J. B. Potter.
17. S. Baker.
18. John S. Miller.
19. Daniel O. Gehr.
20. L. A. Mackey.
21. George Rhey.
22. John Murdoch, Jr.
23. William Speer.
24. John McDowell.
25. J. B. Lawson.
26. J. D. Kirkpatrick.
27. Thomas J. Edge.

ADDITIONAL MEMBERS OF THE EXECUTIVE COMMITTEE.

A. Wilhelm.
Abner Rutherford.
John H. Ziegler.
William Taylor.
R. S. Allen.

EX-PRESIDENTS—MEMBERS OF THE BOARD.

Frederick Watts.
D. Taggart.
Jacob S. Haldeman.
Thomas P. Knox.
A. Boyd Hamilton.
Amos E. Kapp.
John C. Morris.
J. R. Eby.

TREASURER.

John B. Rutherford.

CORRESPONDING SECRETARY

Elbridge McConkey.

RECORDING SECRETARY.

D. W. Seiler.

CHEMIST AND GEOLOGIST.

S. S. Haldeman.

ASSISTANT CHEMIST AND GEOLOGIST.

Hugh Hamilton.

LIBRARIAN.

William H. Egle.

We, the undersigned judge and tellers, appointed to conduct the annual election of the State Agricultural Society, report the result as above.

TOBIAS BARTO, *Judge.*

ABNER RUTHERFORD,
IRA TRIPP,
Tellers.

On motion of Mr. Haehnlen, the meeting adjourned.

HARRISBURG, *January 17*,—2 o'clock, P. M.

The newly Executive Committee was called to order. In the absence of the President, and on motion of Mr. Seiler, A. Boyd Hamilton acted as President *pro tem.*

The following members were present: Messrs. McCrea, Kennedy, Levering, Edge, Holstein, Barto, Spencer, Neiman, Conner, Tripp, Keller, Kirkpatrick, Branson, Abner Rutherford, Ziegler, Knox, A. B. Hamilton, Kapp, Morris, Eby, J. B. Rutherford, McConkey, Hugh Hamilton, Egle, and Seiler.

The report of the judge and tellers was then read and approved.

Mr. Neiman moved that the Treasurer be authorized to pay the expenses of this Executive Committee. Agreed to.

Mr. Kirkpatrick offered the following resolution; which was agreed to:

Resolved, That a committee of seven, (including the President and two Secretaries,) be appointed by the President, to whom shall be entrusted the general charge of the Society during the interval between the stated meetings of the Executive Committee, including the invitations of proposals for holding the next annual fair of the Society—the selection of location, inclusive of the dates thereof, the issuing of premium list, and general arrangements for said exhibition. Also, that when this committee adjourns it adjourn to meet on the third day of the next annual exhibition, at such hour and place as may be designated by the official head of the Society.

Mr. Kennedy presented, and read for the information of the committee, the following circular:

SECRETARY'S OFFICE, NATIONAL AGRICULTURAL CONGRESS,
GEORGE'S HILL, PHILADEEPHIA, *October 1, 1876.*

SIR:—We send this circular to the members and officers elected at the fifth annual session of the National Agricultural Congress, Philadelphia, September 12 and 14, 1876. At a late session, the constitution was amended in such manner as to greatly extend the membership and promote the efficiency of the organization. Provision was made for an *elective* and a *delegate* membership, for annual reports upon the condition of agriculture in every State and Territory of the Union, and, for the annual publication of a volume of transactions, in which all topics related to agriculture shall be discussed from a national standpoint.

In order to secure the funds for the efficient carrying out of our purpose, an annual fee of *three dollars* is paid by each member. In event of your being willing, as we trust you will be, to aid in this undertaking, we ask you to remit that sum to the treasurer, Ezra Whitman, editor of the *Maryland Farmer*, Baltimore, Maryland, or, if preferred, to the secretary. This will constitute you a member, and entitle you to a copy of the transactions of the late meeting, when issued, which will be before the end of the winter.

The next meeting will be held at Chicago, in the early part of the autumn of 1877; and not less than three days, it is expected, will be occupied by the ablest men, in their several specialties, in addresses upon agriculture and its related topics of natural science and political economy.

We earnestly solicit your aid and coöperation, not only in an early remission of the membership fee, but in sending us the names and post office addresses of any persons, in your own or other States and Territories, who are interested in promoting agricultural education, agricultural science, practical agriculture, and rural economy, and who would make useful members. We desire especially to reach agricultural editors, the officers of agricultural societies, boards of agriculture, granges, farmers' clubs, agricultural colleges, and other organizations intended to promote the intelligence and welfare of the agricultural classes.

W. C. FLAGG, *President,*
Moro, Illinois.

HORACE J. SMITH, *Secretary.*
George's Hill, Philadelphia, Pa.

Mr. Smull offered the following; which was adopted:

Resolved, That a committee of three be appointed to represent the State Agricultural Society, as delegates, to the National Agricultural College, to be held at Chicago, Illinois, who shall serve without compensation.

Messrs. Smull, Kennedy, and Knox were appointed said committee.

Mr. Kennedy offered the following resolutions; which were adopted:

Resolved, That we regard the instruction in theoretical and practical agriculture afforded by the Pennsylvania State College as the distinguishing feature of the institution.

Resolved, That we call upon the authorities of the College to perfect said institution to its fullest extent, and that a committee be appointed to correspond with them on the subject, and report to the Executive Committee.

Said committee consists of Messrs. Kennedy, Rhey, and Kirkpatrick.

Mr. Rhey offered the following; which was adopted:

Resolved, That the committee of seven having charge of arranging for the fair of this year, are hereby empowered to employ a competent person to canvass the State for the exhibition of stock and other farm products at said fair if, in their judgment, it would result advantageously to the Society and the public.

The committee appointed to audit the report of the Treasurer, presented the following statement:

JOHN B. RUTHERFORD, *Treasuser, in account with Pennsylvania State Agricultural Society.*

DR.

1876.		
Jan. 19.	Balance in treasury,	$3,958 35
Sept. 14.	Cash from members of the Society,	2,008 00
Oct. 20.	State appropriation,	2,000 00
1877.		
Jan. 12.	Cash from M. C. Eby, interest,	60 00
		$8,026 35

CR.

By rent office in Harrisburg,	$473 00
Expenses of Executive Committee,	530 90
Printing and stationery,	219 00
Premiums in 1875,	383 00
Medals,	113 36
Expenses of Secretary's office,	297 90
Police, &c,	47 50
Preparation of grounds,	31 74
Premiums and expenses attending the Executive Committee during the Centennial Exposition, at Philadelphia, from May to October, 1876,	2,031 00
Balance,	3,898 95
	8,026 35

The undersigned committee appointed to audit the account of the Treasurer, report that we have examined the accounts, compared the vouchers, and find it correct.

J. R. EBY,
J. D. KIRKPATRICK,
A. E. KAPP,
Committee.

HARRISBURG, *January 16, 1877.*

Mr. Rhey's resolution was then discussed, and the minority report was adopted.

The President appointed Messrs. Rhey, Abner Rutherford, and Seiler a committee to submit to the Legislature the bill as adopted and approved

On motion, adjourned.

D. W. SEILER,
Recording Secretarg.

ERIE, PA., *February 27, 1877.*

Messrs. D. W. SEILER, *Recording Secretary*, ELBRIDGE MCCONKEY, *Corresponding Secretary, and others, constituting the Pennsylvania State Agricultural Society:*

DEAR SIRS:—Your telegram advising me of my election as president of your Society, arrived at my home, in my absence, and, on my return, was responded to by telegraph accepting the position. I improve this opportunity to send a more formal reply to your letters. This has been delayed by pressing official and personal business. In accepting the honor which your partiality conferred upon me, I feel more deeply grateful, because it was a surprise, and without my previous knowledge or solicitation, and I regard it as a high compliment. I hope, by faithful efforts, to merit your confidence, and contribute to the success of our honored Society, composed, as it is, of gentlemen of enterprise, experience, and integrity, to whom our State is so largely indebted for the sagacity displayed in the promotion of our industrial interests, agriculture, horticulture, the arts, mechanics, and all that is best and useful for a great people. The advantages of these annual exhibitions cannot be too highly appreciated. Their benefits are enduring and widespread, and inspire renewed energy in the cause of improvement. The finest live stock of all kinds are exhibited, and we know that intelligent and ambitious observers are attracted and induced to take stock elswhere for improvement. New and improved machinery, labor-saving utensils, and implements, the products of the farm, garden, dairy, orchard, and vineyard, and the thousand of other things common to our climate and industry, are arrayed for inspection. Intercourse is established between exhibitors, and their comparison of views and experience gives the fairs the character of a practical school of instruction. Every fair is an era in our history, disseminating new light, not only in our immediate vicinity, but in regions remote from us. A few years since I joined, with others, to induce your Society to hold fairs here, and I devoted my efforts to securing and improving suitable grounds. These exhibitions proved successful, and afforded the thousands of visitors an opportunity to see our lake and famous harbor, as well as to witness the display. Their location and value commend them. At a convenient time, to be designated by you, I hope to meet you and the committee on location, at Harrisburg, for consultation, as to the best policy to be pursued.

Respectfully yours,

J. W. HAMMOND.

REPORT

OF

DISBURSEMENTS OF PREMIUMS OF $1,000,

GIVEN TO

Centennial Exposition by the Pennsylvania State Agricultural Society.

INTERNATIONAL EXHIBITION, 1876,
UNITED STATES CENTENNIAL COMMISSION,
PHILADELPHIA, *March 2, 1877.*

SIR :—I have the honor to transmit herewith copies of the awards of the special prizes offered by the Pennsylvania Agricultural Society, at the International Exhibition, of 1876, being assigned, as follows :

$100 for the best exhibit of cereals : D. Landreth & Sons, Philadelphia.

$100 for the best exhibit of Feeding Roots : D. Landreth & Sons, Philadelphia.

$100 for the best herd of Short Horn Cattle : B. B. Groom & Son, Winchester, Kentucky.

$100 for the best herd of Jersey Cattle : Charles L. Sharpless, Philadelphia.

$100 for the best exhibit of Swine : T. S. Cooper, Coopersburg, Pennsylvania.

$100 for the best flock of Long Wool Sheep : Russell Swanwick, Cirencester, England.

$100 for the best flock of Short Wool Sheep : J. T. Stickney, Shoreham, Vermont.

$100 for the best flock of Middle Wool Sheep : A. J. Milton Druce, Eynsham, England.

$100 for the best display of Poultry : Wm. H. Todd, Vermillion, Ohio.

The offer of the prize of $100, for the " best display of Forage Plants," was returned by the judges, marked " no competition."

If you will have the kindness to deposit the aggregate amount of these awarded prizes, nine hundred dollars, with Frederick Fraley, Esquire, treasurer of the Centennial Board of Finance, and apprise me when the deposit has been made, I will transmit, to each of the above-named parties, an order for one hundred dollars.

Very respectfully,
Your obedient servant,
A. T. GOSHORN,
Director General, United States Centennial Commission.

To Dr. James A. McCrea, *Chairman, Special Commission Pennsylvania State Agricultural Society, 2004 West De Lancey Place, Philadelphia.*

Philadelphia, *September 29, 1876.*

PENNSYLVANIA PRIZE.

REPORT ON AWARDS.

Group No, . . .

Catalogue No. . . .

Product—Herd of Short Horn cattle: one bull and four cows.

Name and address of exhibitor—B. B. Groom & Son, Winchester, Kentucky.

The undersigned, having examined the product herein described, respectfully recommends the same to the United States Centennial Commission, for award, for the following reasons, viz:

That in excellence of form, quality, and useful characteristics, the animals composing this herd are all entitled to rank as first-class specimens of the Short Horn breed, and we recommend that it be awarded the prize offered by the Pennsylvania State Agricultural Society, as the best Short Horn herd on exhibition.

T. C. JONES,
Judge.
COLIN CAMERON,
S. J. LYNCH,
JAMES MOORE,
E. OLDENDORFF,
H. C. MEREDITH,
ASHBEL SMITH,
Group Judges.

True copy: W. J. Cheyney,
Secretary Bureau of Awards.

PENNSYLVANIA AGRICULTURAL PRIZE.

REPORT ON AWARDS.

Group No, . . .

Catalogue No, . . .

Product—Best herd of Swine.

Name and address of exhibitor—T. S. Cooper, Coopersburg, Pennsylvania.

The undersigned, having examined the product herein described, respectfully recommends the same to the United States Centennial Commission, for award, for the following reasons, viz :

Berkshire swine. Catalogue numbers, Nos. 4, 38, 39, 11, 25, 30, 26, 40. For high excellence in quality, uniformity of symmetry, great constitutional development, and for being very superior specimens of the breed to which they belong.

W. RHOADES,
Judge.
G. W. BAKER.
J. S. MAYNARD,
J. M. WASHBURN,
Group Judges.

True copy : W. J. CHEYNEY,
Secretary Bureau of Awards.

REPORT ON AWARDS.

Pennsylvania Agricultural Society, special prize. Long wools.

Group No, . . .

Catalogue No, . . .

Product—One Ram, four Ewes. Cotswold.

Name and address of exhibitor.—Russell Swanwick, Cirencester, Glouscestershire, England.

The undersigned, having examined the product herein described, respectfully recommends the same to the United States Centennial Commission, for award, for the following reasons, viz :

For high excellence in quality, uniformity of symmetry, great constitutional development, and for being very superior specimens of the breed to which they belong.

OWEN C. RICHARDS,
Judge.
P. H. LANNAN,
ALEXANDER BARRIE,
J. S. MAYNARD,
Group Judges.

True copy : W. J. CHEYNEY,
Secretary Bureau of Awards.

REPORT OF AWARDS.

Group No. 32.

Catalogue No. 791, appendix "A," (American Merino.)

Product—Four Ewes and one Ram. For the sweepstakes prize, offered by the Pennsylvania Agricultural Society, of one hundred dollars.

Name and address of exhibitor—J. T. Stickney, Shoreham, Vermont.

The undersigned, having examined the product herein described, respectfully recommends the same to the United States Centennial Commission, for award, for the following reasons, viz:

For the best flock of American Merino sheep, of any age.

GEORGE CAMPBELL,
Judge.

M. STOCKING,
J. S. MAYNARD,
O. H. P. BUCHANAN,
Group Judges.

True copy: W. J. CHEYNEY,
Secretary Bureau of Awards.

REPORT ON AWARDS.

Sweepstake. Middle wool.

Group No, . . .

Catalogue No, . . .

Product—Ram Oxforddown, named Freeland.

Name and address of exhibitor—A. J. Milton Druce, Eynsham, England.

The undersigned, having examined the product herein described, respectfully recommends the same to the United States Centennial Commission, for award, for the following reasons, viz:

For high excellence in quality, uniformity, symmetry, great constitutional development, and for being a very superior specimen of the breed to which it belongs.

OWEN C. RICHARDS,
Judge.

P. H. LAMAN,
ALEXANDER BARRIE,
J. S. MAYNARD,
Group Judges.

True copy: W. J. CHEYNEY,
Secretary Bureau of Awards.

SPECIAL PENNSYLVANIA AGRICULTURAL PRIZE.

REPORT ON AWARDS.

Group No. 35.

Catalogue No, . . .

Product, . . .

Name and address of exhibitor—William H. Todd, Vermillion, Ohio.

The undersigned, having examined the product herein described, respectfully recommends the same to the United States Centennial Commission, for award, for the following reasons, viz:

For the best display of Poultry.

MARK PITMAN,
Judge.
JOHN ALDOUS,
Z. C. LUSE,
A. M. HALSTED,
W. T. ROGERS,
Group Judges.

True copy: W. J. CHEYNEY,
Secretary Bureau of Awards.

PHILADELPHIA, *October 24, 1876.*

COMPETITIVE AWARD REPORT.

Group No, . . .

Catalogue No, . . .

Product, . . .

Name and address of exhibitor, . . .

The undersigned, having examined the product herein described, respectfully recommends the same to the United States Centennial Commission, for award, for the following reasons, viz:

The jurors, to whom were referred the articles in competition for the premium offered by the Pennsylvania Agricultural Society for the best display of cereals, respectfully report that they have made the award to the remarkably fine collection of D. Landreth & Son, Philadelphia.

. . . . ,
Judge.
W. L. SCHAFFER,
A. W. HARRISON,
EDWIN SATTERTHWAITE,
JOSIAH HOOPES,
WILLIAM PARRY,
Group Judges
THOMAS MEEHAN, *Secretary.*

True copy: W. J. CHEYNEY,
Secretary Bureau of Awards.

PHILADELPHIA, *October 12, 1876.*

COMPETITIVE REPORT.

Group No, ...
Catalogue No, . . .
Product, . . .
Name and address of exhibitor, . . .

The undersigned, having examined the product herein described, respectfully recommends the same to the United States Centennial Commission, for award, for the following reasons, viz:

The undersigned jurors, to whom was referred the examination of the articles in competition, under schedule * 2, respectfully report that they have made the award to D. Landreth & Son, Philadelphia, Pennsylvania.

. . . . ,
Judge.

W. L. SCHAFFER,
A. W. HARRISON,
EDWIN SATTERTHWAITE,
Group Judges.
THOMAS MEEHAN, *Secretary.*

True copy: W. J. CHEYNEY,
Secretary Bureau of Awards.

* "Best display of Feeding Roots."

PHILADELHHIA, *October 3, 1876.*

REPORT ON AWARDS.

Group, . .
Catalogue No, .
Product—Jersey herd.

Name and address of exhibitor—Charles L. Sharpless, Philadelphia, Pennsylvania.

The undersigned, having examined the product herein described, respectfully recommends the same to the United States Centennial Commission, for award, for the following reasons, viz:

That this herd is one of very high quality, both in the bull and the cows.

It is to be highly commended, and is recommended as worthy of receiving the prize offered for the best herd by the Pennsylvania Agricultural Society.

"Chelton Duke,"	Catalogue	No.	209.
"Black Bess,"	"	"	274.
"Milkmaid,"	"	"	275.
"Tiberia,"	"	"	273.
"Lady Maud,"	"	"	273.

J. MILTON MACKIE,
Judge.
GEORGE E. WARING, Jr.,
L. HENRY TWADDELL,
EDWARD HOWE,
Group Judges.

True copy: W. J. CHEYNEY,
Secretary Bureau of Awards.

PENNSYLVANIA STATE FAIR.

List of Premiums Awarded at Erie, 1877.

CLASS I.—Thorough Bred Herds.

D. D. Tracy, Erie, herd Holstein cattle, about twenty in number, all showing very high breeding and fine milking properties, first premium,	$50
Same. For herd of Jerseys, first premium,	50
J. C. Thornton, Fairview, herd of short horns, first premium,	50
E. R and W. L. Cowden, Harborcreek, herd of Ayrshires, first premium,	50
Walter Cole, Batavia, New York, herd of Devons, first premium,	50

The Committee on Herds of Thorough Bred Stock, respectfully report that they have performed the duty assigned them, and award the premiums as above.

M. E. C. Bliss, of Westfield, New York, and Walter Cole, of Batavia, New York, exhibited very superior herds of Devon cattle. After careful examination of the individual animals, they found great difficulty in arriving at a decision, and, after considering the fine quality of Mr. Cole's herd, they award him the premium.

Messrs. Fuller & Offorth, of Leesburg, Kentucky, exhibited two bulls and three cows, of the short horn breed—each animal of superior merit. There being but three females, they did not come up to the requirements of a herd.

GEORGE BLIGHT, *Chairman*,
O. O. POTTER,
JOHN F. MILES,
HERMAN JAMES,
Committee.

J W. Hammond,
President Pennsylvania Agricultural Society.

CLASS II.—THOROUGH BRED CATTLE.

Ayrshires.

E. R. and W. L. Cowden, Harborcreek, Pennsylvania, bull " General Brock," first premium,	$30
Same. Cow " Flora," fifth, first premium,	20
Same. Heifer " Leila," first premium,	15
Same. Bull calf " Merton," first premium,	10
Same. Heifer calf " Maggie May,"	10
Same. Heifer calf " Mystic," second premium,	10
Same. Cow " Flora," second premium,	15

Devons.

E. C. Bliss, Westfield, New York, heifer " Beauty," second premium,	10
Same. Heifer " Portia," first premium,	10
Walter Cole, Batavia, New York, bull " Puritan," second, first premium,	30
Same. Bull " Puritan," third, first premium,	15
Same. Cow " Lovely," eighteenth, first premium,	20
Same. Cow " Lovely," nineteenth, second premium,	15
Same. Cow " Lovely," twenty-first, first premium,	15
Same. Cow " Puritan Girl," first premium,	15
Same. Heifer " Lady Elgin," sixth, first premium,	10

Holstein.

D. D. Tracy, Erie, bull " Hector," first premium,	30
Same. Bull " Geneva Duke," first premium,	15
Same. Bull calf under one year, first premium,	10
Same. Cow " Anna," first premium,	20
Same. Cow " Leda," second premium,	15
Same. Cow " Primrose," first premium,	15
Same. Cow " Lady Wallace," first premium,	15
Same. Cow " Rose of Erie," second premium,	10
Same. Heifer calf, first premium,	10

Short Horns.

William Skelton, Meadville, bull " Constant Duke," second premium,	15
Same. Cow " Flora," second premium,	15
Same. Heifer calf " Belle of Crawford," first premium,	15
Same. Bull calf " Red Duke," third, first premium,	10
S. C. Smith, Ashtabula, Ohio, cow " Belle," sixth, second premium,	10
E. Rundell, North East, bull " Bonner," first premium,	20

William Fairweather, McLane, Pennsylvania, Ayrshire bull, "Sitting Bull," first premium,	$15
F. A. Bemus, Ripley, New York, cow, (short horn,) between two and three years,	15
J. C. Thornton, Fairview, Pennsylvania, bull "Duke of London," second premium,	20
Same. Heifer, between one and two years, second premium,	10
Same. Calf under one year, first premium,	10
Same. Calf "Frontier Duke," second premium,	5
F. D. Raymond, Findley's Lake, New York, Jersey bull, three years old, first premium,	30
G. C. Crandall, Erie, Jersey bull, second premium,	20

Alderneys.

D. D. Tracy, Erie. bull "Prince," second premium,	15
Same. Cow "Annie," first premium,	20
Same. Cow "Mary," second premium,	15
Fuller & Offuth, Leesburg, Kentucky, bull "Fairy Duke," first premium,	30
Same. Bull "Duke Illustrious," first premium,	15
Same. Cow three years old, first premium,	20

To JOHN W. HAMMOND, *President:*

Your committee on Class No. 2, Thorough Bred Cattle, have the honor of reporting that the exhibition of Short Horns is very fine. A large number of most excellent animals, and it has been a most difficult matter for the judges to discriminate between the many fine points of the different animals on exhibition.

Messrs. Fuller & Offuth, of Leesburg, Kentucky, exhibited a few very choice animals, very beautiful and well cared for. Mr. Skelton, of Meadville, also exhibited a herd of choice animals, well bred, with very fine points.

Mr. Thornton, of Fairview, Pennsylvania, has shown his firm judgment in selection of Short Horns.

Mr. Smith, Ashtabula, Ohio, had a number of choice animals on exhibition.

D. D. Tracy, of Erie, Pennsylvania, added to the exhibition by the show of his very fine herds of Holsteins and Alderneys.

Mr. Cole, of Batavia, New York, had on exhibition one of the finest, if not the best, herds of Devons in the State of New York, and we only wish he had more competition.

Messrs. Cowdens, of Harborcreek, Pennsylvania, had a herd of Ayrshires on exhibition, with some superior animals among them; but they, like the Devons and Holsteins, had no competition.

J. C. MORRIS, *Chairman*,
JOHN T. WILSON,
JAMES SAMPSON,
JAMES MILES,
Committee.

CLASS III.—Herds Working Oxen and Fat Cattle.

J. C. Thornton, Fairview, yoke of oxen, second premium,	$5
Benjamin Tome, Kearsage, yoke of oxen, first premium,	10
S. C. Smith, Ashtabula, Ohio, best display of farm stock,	30
Frederick Olds, Fairview, yoke of trained oxen,	Dip.

J. W. Hammond, *President.*

Sir:—The display in this class is so very excellent that we regret very much that, under the regulations, we could not award any other premiums. We are admirably well pleased with an excellent pair of white oxen, owned by Frederick Olds. Their good training could not be surpassed.

J. S. KELLER, *Chairman.*
JOE. M. SHAFER,
A. GOHL,
JAMES CROSS,
J. O. CHESNEY,
J. F. McCLURE,
Committee.

CLASS IV.—Native and Grade Cows.

William Skelton, Meadville, one native heifer, between one and two years, first premium,	$7

To John W. Hammond,
President Pennsylvania State Agricultural Society.

We, the undersigned, respectfully report that the above are the conclusions and awards made by us.

JOHN S. MILLER, *Chairman*,
J. R. CRAWFORD,
A. ACHESON.

CLASS V.—Fine Bred Horses, Mares, and Colts.

C. G. Dempsey, Spring, stallion "Bigaroon," (thoroughbred,) first premium,	$20
Same. Stallion "Belmont," second premium,	10
Same. Mare "Infallible," (thoroughbred,) first premium,	5

Mott Sherman, Albion, stallion " Percheron," first premium,	$20
J. Van Scoter, Erie, stallion " Enfield, Jr.," first premium,	30
J. B. Welch, Spring, brood mare with foal, four years and upwards, second premium,	15
Same. Sucking horse colt, first premium,	5
W. D. Wetmore, Spring, stallion " Combination," three years, and stallion " Plato," three years old, first premium,	10
T. M. Prendergast, Westfield, New York, best brood mare with colt, first premium,	25
H. P. Wade, Ashtabula, Ohio, stallion " New York," ten years old, second premium,	30
Same. Stallion " Mapleton," three years old, second premium,	20
Same. Stallion " D. Hill," two years old, first premium,	15
Same. Mare " Fleet," six years old, first premium,	15
Same. Mare " Mischief," three years old, first premium,	15
Same. Mare one year old, first premium,	5
Stratton & Mellon, Evansburg, Pennsylvania, stallion " Hull," four years, second premium,	30
Same. Stallion " Tracy," two years, second premium,	10
Same. Filly " Noontide," three years, second premium,	20
Hollenbeck & Bowman, Spring, imported stallion " Highland Prince," second premium,	10
M. H. Taylor, Fredonia, New York, stallion " Ledger,"	60
A. Whipple, Saegertown, mare " Gail Hamilton," four years old, second premium,	10
J. Littlefield, Buffalo, Clydesdale, stallion, heavy draught, two years old, first premium,	10
T. M. Prendergast, Westfield, New York, stallion " Dorsey," eight years,	dip.
William L. Fox, Foxburg, Hambletonian stallion, seven years old,	dip.
A. Whipple, Saegertown, stallion " Saturn," seven years old,	dip.

We, the committee on Class No. 5, certify that the awards set opposite the entries are correct, and further desire to report, that the exhibition of stock in this class was the finest that ever came under our observation. In many instances it required great difficulty to judge between the merits of animals, and if the rules would have allowed, we would have been pleased to award to many superior animals some premiums which, in our judgment, they were entitled to.

WILLIAM TAYLOR, *Chairman*,
J. VAN SCOTER,
JOSEPH MONTGOMERY,
S. A. HUMMEL,
Committee.

CLASS VI.

No. 1—Pete,	$60
Imogene,	30
Northern Spy,	20
Towanda Jim,	15
No. 2.—Hull,	40
Noontide,	20
Gail Hamilton,	15
No. 3.—Henry Clews,	100
Lotus,	60
Pete,	40
Special.—Kitty,	50
Jim,	30
John the Baptist,	20

Running Race.

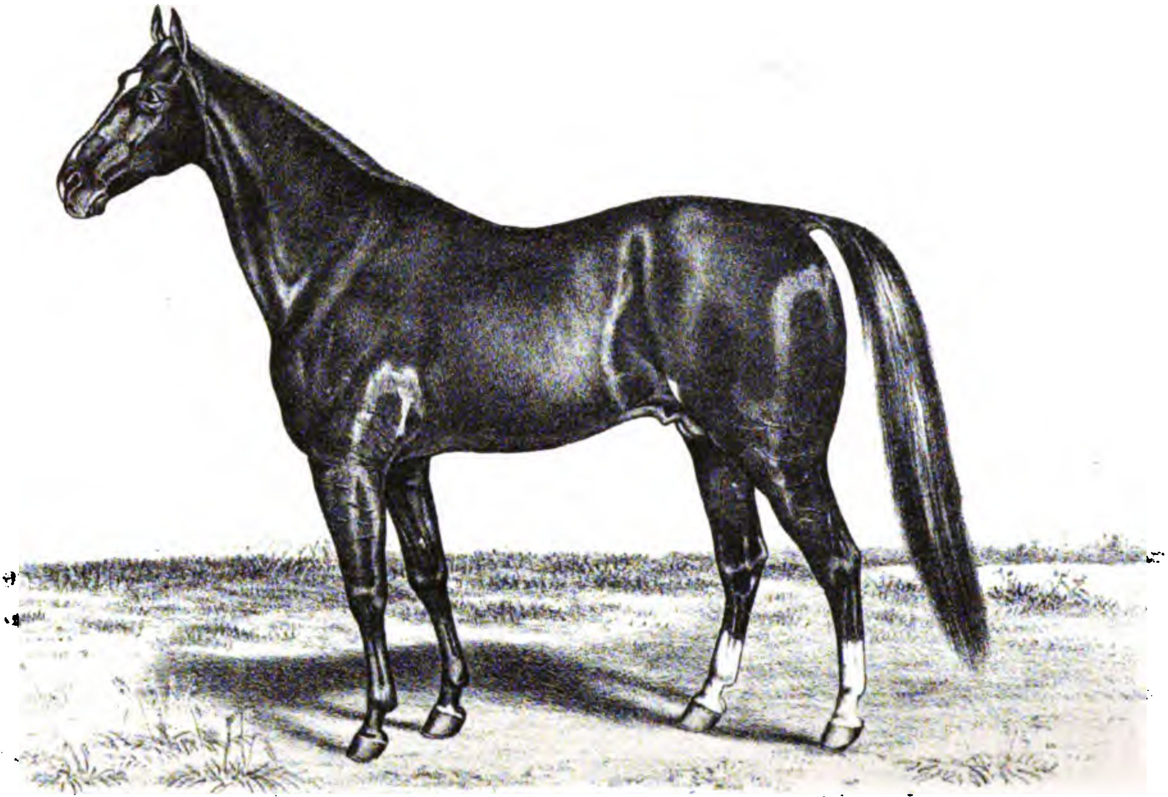
No. 4.—Bay Jim,	$25
Florence,	15
Troubadour,	10
No. 5.—Silver Cloud,	150
Minnie Lee,	70
Phil. Sheridan,	30
No. 6.—Pale Face,	75
Hendricks,	50
Bonnie,	25

Running Race.

Bay Jim,	$15
Florence,	15
Troubadour,	10

CLASS VII.—MATCHED HORSES.

G. H. Howard, Wattsburg, Pennsylvania, pair best matched horses,	$15
C. G. Dempsey, Spring, Pennsylvania, second best pair matched horses,	10
Frank Hull, Erie, best gelding for harness,	15
Sampson Short, North East, second best gelding,	5
Heman James, Erie, best family mare,	10



"LEDGER"

Property of M.H.Taylor, *Fredonia, N.Y.*

Exhibited at Erie, 1877.

S. B. Lockwood, —— second best family mare,	$6

We, the undersigned revisory committee, make the above awards.

A. E. KAPP,
JOHN S. MILLER,
JOHN McDOWELL,
WILLIAM TAYLOR,
Committee.

CLASS VIII.—Stallions and Mares for all Work.

George Cutler, West Greene, brood mare with foal, second premium,	$10
William T. Myers, West Greene, stallion, "Prince Henry Clay," four years old, second premium,	10
F. P. McBride, Crossingville, stallion, heavy draught, first premium,	20
J. M. May, Swanville, stallion for harness, four years,	dip.
Melcher Bletz, Erie, stallion, quick draught, "Tom Hyer," five years, first premium,	15
William Lawrence, Spring, quick draught stallion, six years,	dip.
Same. Heavy draught stallion, over four years and under six,	dip.
Same. Heavy draught stallion, over six years, first premium,	25
J. A. Webster, Fairview, mare over six years, first premium,	15
Philip Titus, Sherman, New York, stallion, three years old, first premium,	10
C. C. Capron, Wattsburg, stallion, "Tom Hyer," second premium,	10
W. Weeks, Girard, stallion, two years,	dip.
G. W. Barton, West Greene, stallion, "Young Norman," six years old, quick draught,	dip.
Jesse Ebersole, Harbor Creek, brood mare, with foal, ten years, first premium,	15
J. D. Mead, Wesleyville, mare, two to three years old, quick draught, second premium,	5
F. P. Norris, North East, stallion, one to two years old, first premium,	15
Jacob Johann, Erie, stallion, between two and three years old, second premium,	5
W. H. Belknap, Elgin, stallion "Young Paris," quick draught,	dip.
S. M. Eaton, Fairview, draught mare, six years old and over, second premium,	10
Same. Mare colt, two years old, first premium,	10
Andrew Black, Erie, stallion, six years old,	dip.
A. D. Shearer, Venango, stallion, "Grit Gold-dust," six years old, quick draught,	dip.
E. R. Allen, Millvillage, stallion, "Ben Butler," six years, second premium,	20

E. W. Merrill, North East, brood mare, second premium,	$10
E. M. Cooper, Union City, fine bred gray mare, "Kitty," five years, first premium,	10

TOBIAS BARTO,
J. BOLAND,
GEORGE TABER,
Committee.

CLASS IX.—Jacks and Mules.

J. C. Thornton, Fairview, best pair mules,	$15
George Bowman, Beaver, Pennsylvania, second best pair mules,	5
William Willis, North East, native jack, first premium,	15

A. F. ENGLEBERT,
JOHN F. MILES,
R. C. PEEBLES,
ISAAC MILLER,
A. C. NOYES,
Committee.

To the President of the Pennsylvania State Agricultural Society:

We, the undersigned committee appointed to adjudge the entries in Classes No. 10 and 11, beg leave to submit the following report:

The entries in both classes were limited, except in Cotswold, which were very fine, with but little competition. In all other families few, but of superior excellence, reflecting credit to owners as breeders of fine stock.

CLASSES X and XI.—Fine Breed Sheep.

Thomas P. Dickson, Clark, Pennsylvania, Cotswold buck under two years, first premium,	$10
Same. Cotswold buck over two years, first premium,	15
Same. Buck and five lambs, his get, first premium,	20
Same. Pen five ewes Cotswolds, first premium,	15
Same. Pen nine ewes Cotswolds, first premium,	20
William S. Skelton, Meadville, buck and five lambs, his get, second premium,	15
J. C. Thornton, Fairview, pen nine ewes, Cotswolds, second premium,	15
Same. Pen five ewes Southdown, first premium,	15
Same. Southdown buck, first premium,	15
William E. Marvin, North East, Merino buck over three years, first premium,	15
Same. Best fleece, first premium,	10
T. A. Bemus, Ripley, New York, Merino buck, first premium,	10

Same. Pen five Merino ewes, first premium,	$15

DAVID H. BRANSON,
ABNER RUTHERFORD,
ISAAC MUMMA,
TOWSEND WALTER,
W. W. EATON,
Committee.

CLASS XII.—Swine.

Perry Nicholson, West Millcreek, Poland China boar, first premium,	$5
William Skelton, Meadville, best breeding sow,	10
Same. Imported boar, (Berkshire,) "Lord Chancellor,"	15
E. Rundell, North East, second best boar over two years,	5
Same. Best boar under two years,	10
S. C. Thornton, Fairview, best Berkshire boar under two years,	10
F. D. Raymond, Findley's Lake, New York, Berkshire boar under nine months,	5
J. A. Webster, Fairview, best Berkshire boar over two years,	10
E. B. Ashbridge, West Chester, best herd of swine,	25
Same. Best herd of swine under six months,	10
Same. Best sow, Chester white, under two years,	10
Same. Best Chester white boar, six months old,	5
Same. Boar Jack, twenty-two months old,	10
Same. Best pair sows,	5
Same. Best six pigs under sixteen weeks,	5
Same. Second best boar and sow,	8

The best display of swine, although not large, is very fine, particularly the display of Chester whites, by E. B. Ashbridge, Willistown Inn, Chester county.

H. M. Skelton, of Meadville, exhibits an imported Berkshire boar, well worthy of a premium. We would be glad to specify many other exhibits, but space prevents.

J. D. KIRKPATRICK, *Chairman*,
JOSEPH VAN KIRK,
NORMAN PATTERSON,
Committee.

CLASS XIII.—Poultry.

E. A. Woodbury, Erie, best trio Partridge Cochins,	$2
G. Avery, Erie, best trio Golden Spangled Polands,	2
T. A. Webster, best trio Light Brahmas,	2
Guy Johnson, Erie, best two Plymouth Rock,	2
George Avery, Erie, best trio black-breasted red game Bantams,	2

Johnston Eaton, Fairview, best pair Pekin ducks, ... $3

The judges in this class report that they find the display rather limited. They have awarded the above premiums.

They also mention, as worthy of notice, a trio of Plymouth Rock chickens, placed on exhibition by William Fairweather which, not coming within the requirements of the Society as to age, cannot be allowed a premium.

JOSEPH H NISSLEY, *Chairman.*
GEORGE H. ETTLA.

CLASS XV.

To the President and Members of the Executive Committee, Pennsylvania State Agricultural Society :

GENTLEMEN :—Your committee have had a very difficult task to perform. The entries on exhibition were all of the best manufacture, and so near perfection, that it was difficult to discriminate between their relative merit.

The splendid display of D. M. Osborne & Co., with their great variety of machines, was highly creditable to the firm and to the exhibition ; all show great merit. Of the others, we most cheerfully commend each one to the patronage of the public, and do not hesitate in giving our united opinion, they are all very good, and well worthy of recommendation.

We trust we have done our duty to the exhibitors, and return the thanks of the Society to them for their splendid display of machinery.

N. W. RUSSELL, *Chairman.*
R. H. ARBUCKLE,
A. TAGGART,
B. BINGHAM,
Committee.

CLASS XVI.—THRESHING MACHINES AND HORSE POWERS.

Gregory Brothers, Erie, vegetable cutter and grater, diploma.

H. M. Reed & Co., Erie, corn-stalk cutter and grinder, diploma.

L. A. Marcy, Venango, hay-press, committee recommend a medal.

Warren & Hammond, Mayville, New York, grain separator, special mention.

C. Aultman, Canton, Ohio, thresher and cleaner, special mention.

A. B. Farquhar, York, Pennsylvania, separator, special mention.

We, the undersigned, Committee in Class No. 16, have examined the different articles entered in said class, and report as above.

Warren & Hammond, of Mayville, New York, exhibits a grain separator, (Queen of the Harvest.) It is the most perfect separator we have ever seen, separating the different grains and seeds from each other in the most perfect manner, and is worthy of special mention.

L. M. Crosby, of Ashtabula, Ohio, shows a fanning mill, good of its kind, and well adapted to clean grain.

C. Altman, Canton, Ohio, exhibits thresher and cleaner. This is a very fine machine, and well adapted to do the work intended, and it is well worth the attention of farmers. Also, a grain register, that surpasses anything of the kind we have ever seen. Very simple of construction, and correct in count.

A. B. Farquhar, of York, Pennsylyania, exhibits a thresher and separator. It is superior in finish, and well adapted to its work. It dispenses with riddles, and hence is free from clogging up. It has other improvements, which are claimed to be of great advantage in threshing and cleaning. The corn-shellers, particularly the "Lancaster," shown by that firm, are worthy of special mention and notice.

L. A. Marcy, of Venango, Pennsylvania, had on exhibition a hay-press, which was well adapted for the use intended, strong and durable. If the rules of the Society did not prohibit, we would recommend a medal.

J. B. LAWSON, *Chairman*,
ELIAS RITTS,
J. M. KUHN,
Committee.

JOHN W. HAMMOND, *President.*

After the committee had reported, and on account of the delay by the railroad company, the exhibits of S. & G. Hauch, of Mechanicsburg, Pennsylvania, were tested, and the sub-committee would, if in their power, recommend an award be made to the above parties for their valuable inventon of "Corn-Stalk Cutter and Grinder," and cheerfully recommend it to the favor of the farmers throughout the country.

CLASS XVII.—CIDER MILLS, CHURNS, ETC.

Boomer & Boschert, Syracuse, New York, cider press with power, first premium, diploma.

W. F. Hansbrow, Erie, California excelsior force pump, first premium, diploma.

A. B. Gunnison, Erie, well and cistern pumps, cucumber wood, first premium, diploma.

Mulholland & Fellers, Warren, Morning Glory churn and cooler combined, second premium, and worthy mention.

L. W. Olds, Erie, well and cistern pumps, water tubing, diploma.

A. B. Farquhar, York, Pennsylvania, American cider mill, worthy mention.

French & McKnight, Erie, churn, "Blanchard's," first premium, diploma.

G. W. Low, Erie, patent vertical action wood pumps, first premium, diploma.

Same. Patent flexible metallic pumps, (sucker,) first premium, diploma.

Boomer & Boschert, Syracuse, New York, apple grater, unquestionably the best made.

Your committee desire to report that they have examined the revolving churn exhibited by R. W. Fernur, of Stockton, New York. After a full and careful examination of testimony confirmatory of the claims made by the exhibitor, we would commend the churn to the favorable consideration of farmers.

Respectfully,

W. W. SPEER,
GEORGE RHEY,
JOHN BOYLE,
JOHN McDOWELL.

CLASS NO. XVIII.

The committee respectfully report that they have examined the articles entered in this class, and would say:

That as to the "Farmers' Friend Grain Drill," although there was no practical test, we unhesitatingly pronounce in favor of it, by reason of the feed roller occupying the entire space of the feed cups, and also that the change of quantity can be made while the machine is in operation.

The "Champion Grain Drill" we deem an excellent article, by reason of the seed and broadcast attachments, being calculated to sow anything, lime, plaster, ashes, fine or coarse, bone, guano, and other fertilizers.

The "Buckeye," McSherry, and, indeed, all others on exhibition, are excellent articles, and deserve favorable mention, and when all are *good*, it is difficult to select the best.

The Seven-Power and Stump Extractor, a machine very useful, and highly recommended.

Seed Sowers, broadcast and others, all excellent articles in their way.

IRA TRIPP, *Chairman*,
JAMES CHAMBERS,
Committee.

CLASS XIX.—WAGONS, CARTS, DRAYS, AND CARRIAGES.

H. M. Reed & Co., Erie, Farm Wagon complete, bronze medal.

Same. Railroad and Dirt Barrow, diploma.

Same. Pleasure Wagon, ... $2

William Dunmeyer, Union City, Pleasure Wagon, diploma.

Erie Chair Company, Erie, two Childrens' Carriages, diploma.

Mullet, Grant & Bissell, Fredonia, Extension Top Carriage, bronze medal

Same. Two Top Buggies,	$5
Same. Open Side-bar Buggy,	2
Erie City Carriage Works, four Bowed-top Pleasure Phætons,	3
Same. Side-bar Brewster Top Buggy, bronze medal.	
Same. Three-inch Thimble Skein Jackson Wagon, (lumber,) diploma.	
William L. Booth, Concord Station, Pennsylvania, Farm Wagon, complete, (imp.),	10
Johnston Eaton, Fairview, Garden Wheelbarrow, diploma.	
Erie Torsion Spring Company, wagon with Torsion Springs attached, diploma.	
H. M. Reed & Co., Erie, Dray, diploma.	
Same. One-horse Express Wagon,	2
J. F. Deal, Corry, Platform Spring Wagon, diploma.	
T. D. Fickinger, Ashtabula, Jump Seat Carriage,	3
Same. Jump Seat Sleigh, diploma.	
Forsyth Scale Works, Warehouse Truck, diploma.	

The undersigned committee have examined all the above articles, and present the above as our awards.

W. W. BOYER,
A. F. ENGLEBERT,
F. A. BOEHMER,
ISAAC MILLER,
Committee.

CLASS XX.—MISCELLANEOUS FARM TOOLS.

H. M. Reed & Co., Erie, best Hay Forks,	$2
Same. Best Manure Forks,	2
Same. Best Axes, Single Blade,	2
R. H. Chinnock, Erie, case and package Horse Shoes,	2

Your committee were agreeably impressed with the improvements which have occurred in the construction of horse hay-rakes, rendering them durable and of easy and perfect management. Whilst giving to the "Reindeer" preëminence, we commend the "Tiger," "Sheldon," "Van Campen," and "Archer," as self-discharging, and entitled to the confidence of the farmers. The other rakes exhibited, possessing the ordinary features of horse hay-rakes, were of good construction. The revolving horse hay-rake, exhibited by Messrs. Haskill & Kibby, was very meritorious of the kind.

GEORGE RHEY,
JOHN BOYLE,
JOHN McDOWELL,
W. W. SPEER,
Committee.

CLASS XXI.—STEAM ENGINES AND CASTINGS.

Davenport, Fairbairn & Co., Erie, very superior exhibit, bronze medal.

Same. Specimens of Car Wheel Iron, diploma.

S. Lilley & Son, Erie, Upright Stationary Engine, good machine, diploma.

Frank & Co., Buffalo, New York, Economist Planer and Matcher, Pony Planer, Band Saw, bronze medal and diploma.

T. B. Cook & Leonard, Gardner, Michigan, Totman's Patent Feed Mill, bronze medal.

Taper Sleeve Pulley-Works, Erie, Shafting and Coupling, bronze medal.

H. C. Crowell, Erie, Half Pulley, bronze medal.

Skinner & Woods, Erie, Horizontal Portable Engine and Return Flue Boiler combined, silver medal.

Holles King & Son, Corry, two Upright Portable Engines, one Boiler, silver medal.

James M. Gray, Wesleyville, Self-propelling Farm Engine attached to Thresher, diploma.

J. Coates, Erie, Water Engine, two-horse power, diploma.

A. N. Elliott, Harborcreek, Champion Steamer and Boiler, diploma.

C. Aultman & Co., Canton, Ohio, Portable Engine for Thresher, bronze medal.

Sidney Broadbent, Scranton, Pennsylvania, Shaft Coupling, first premium, bronze medal.

Milton Love, Corry, Universal Drilling Machine, worthy of diploma.

Oil Engines.

The special committee on Oil Engines awarded the first premium ($50) to the Ball Engine, manufactured by the Stearns' Manufacturing Company, of Erie; the second premium (silver medal) to the Bay State Iron-Works, (Noble & Hall,) Erie; and the third premium (diploma) to Innes & Co., Oil City.

The committee on Class No. 21 have examined the exhibits, and found, in nearly all cases, no competition; but as many of the exhibitors have very useful and valuable articles, we recommend and award the above premiums.

It is with great pleasure that we congratulate the Society on the extraordinary display in this department. At no former exhibition has there been so much power and machinery and engines shown. Some fifteen of the latter in operation at one time. This department, with a complete line of shafting pulleys, &c., was by far the best ever shown since our connection with your Society, and reflect credit upon the section of State where so many are used and manufactured.

Frank & Co., of Buffalo, New York, had on exhibition and in operation their Economist Planer and Matcher, Pony Planer, and Band Saw. They have already had, at the hands of this Society, all the awards that could possibly be given, for the past six or eight years, and this committee takes pleasure in recommending their machines to the public as articles doing all that are represented by said firm, and most creditable to the manufactures.

S. S. SPENCER, *Chairman*,
W. B. CULVER,
W. T. SMITH,
Committee.

CLASS No. XXII.

To the President and Executive Committee of the State Agricultural Society:

GENTLEMEN: The undersigned, your Committee on Displays, report that they have carefully examined the portion of the fair which fell under their province, and found that, amongst others, the following are worthy of especial commendation, and we call the attention of the Society and the public to them, and award premiums as follows, viz:

The Erie Boot and Shoe Company, Henry Baker, and J. A. Eichoulamb severally exhibited boots and shoes, all of which were very creditable, and we award to the Erie Boot and Shoe Company, for articles of their own manufacture, a diploma.

To each of the others, for their display of fine work, boots, shoes, &c., a diploma.

To F. F. Adams & Co., Erie, for their display of ladders, spring beds, mops, complete wringers, tables, wainscoting, &c., all of their own manufacture, a bronze medal.

To French & McKnight, of Erie, for their large and fine display of groceries, a diploma.

Lewis Saddlemeyer, of Erie, for display of upholstering goods, &c., a diploma.

To the Clinton Woolen Manufacturing Company, of Michigan, for their display of fifty separate pieces of woolen goods and cassimeres of a quality equal to the best foreign manufacture, a silver medal.

To A. J. Fitch, of Madison, Ohio, for his fine display of turned wood work, a diploma.

To S. Sobel, of Erie, for his superb display of fine dry goods, laces, millinery goods, bonnets, a silver medal.

To the Keystone Supply Company, of Erie, for their display of gelatine starch, a diploma.

To Ashby & Vincent, of Erie, for their display of blank-books and bookbinding of their own manufacture, a bronze medal.

To W. B. Graham, of Erie, for display of stationery, a diploma.

To Messrs. Magill & Seigell, of Erie, for display of millinery goods, a diploma.

To P. F. Miles & Co., of Erie, for a very fine display of spices and baking powders, a diploma.

The Forsyth Scale-Works, of Erie, deserve especial mention for their display of scales, from the smallest size to the large farm scales, all of their own manufacture, and we award a silver medal.

To Lawrence & Chapin, of Kalamazoo, Michigan, for their display of Diamond iron plows, a diploma.

To H. M. Reed & Co., Erie, for their display of agricultural implements, owned, but not manufactured, by them, a silver medal.

The committee feel justified in expressing the pride they experienced at witnessing the large and varied exhibition of American manufactures, which, in many cases, not only equal, but are far superior, to the same class of foreign make.

Respectfully submitted,

JOHN A. SMULL, *Chairman*,
S. F. CHAPIN,
C. A. HITCHCOCK.

CLASS No. XXIV.

A. D. Strong, Ashtabula, Ohio, hydro-carbon blacking, ...	dip.
J. C. McWilliams, Edinboro, calf-skins, ...	2

J. D. CAMERON,
HENRY BUTTERFIELD,
J. W. ALLISON,
JOHN TRUNKEY,
Committee.

CLASS XXV.—BUTTER, CHEESE, AND HONEY.

J. W. McDowell, Dicksonburg, twenty pounds butter, August, 1877, first premium, ...	$10
Same. Best lot ten pounds butter, very good, but one specimen, therefore no premium.	
A. B. Skeeton, Drake's Mills, cheese under one year old, first premium,	10
J. G. Holman, Conneautville, sixty pounds cheese, white, second premium, ...	5

J. H. Thompson, ——, two packages butter, second premium,	$3
J. S. Bennett, East Greene, firkin butter, second premium,	3
Lyman Burgess, North East, twenty-five pounds butter, first premium,	5
J. W. Dorsey, Middleburg, Cooley's portable creamery,	dip.
Mrs. J. Wolf, Erie, jar June butter, first premium,	10
Miss Ada Bennett, East Greene, lot of butter, made by girl under twenty-one years, first premium,	5
J. McGonnell, Waterford, bee-hives, first premium,	2
Same. Ten pounds honey, second premium,	3
John Quin, North East, butter made in September, first premium,	10
Philip Kramer, Fairview, ten pounds honey, first premium,	5

J. W. Hammond, *President:*

Your committee herewith respectfully report, that the above are the awards made by said committee, and that the display was equal to that of former years.

J. R. EBY, *Chairman,*
GEORGE TABER,
DEAN HAWK.

CLASS XXVI.—Flour and Indian Meal.

Isaac Russell, Erie, best barrel flour,	$5
J. B. Crouch & Co., Erie, best rye flour,	3

JOHN McDOWELL,
J. E. ALLEN,
Committee.

CLASS XXVII.—Grain and Seeds.

Isaac Russell, Erie, best bushel white wheat,	$3
J. E. Williams, North East, best bushel red wheat,	3
C. Leet, Moorheadville, best bushel rye,	3
R. B. Pherrin, Erie, best bushel yellow corn,	2
S. M. Eaton, Fairview, best bushel white corn,	2
J. A. Parker, Erie, best bushel oats,	2
Isaac Mosher, Erie, best bushel barley,	2
J. W. McDowell, Dicksonburg, Pennsylvania, largest and best display of grain seeds, not less than one half bushel each,	10
R. Bear, Fairview, best bushel potatoes,	2
George Dewey, Blooming Valley, largest and best collection seedling potatoes,	3
J. B. Lanaena, best half bushel seedling potatoes,	2
Johnston Eaton, Fairview, best half bushel beans,	
Berst Brothers, Erie, best half peck peas, seed,	2

Same. Best half peck cucumber seed,	$2
Same. Best half peck turnip seed,	2
Same. Best half peck ruta baga,	2
Same. Best half peck sugar beet seed,	2
Same. Best half peck carrot seed,	2
Same. Best half peck parsnip seed,	2
Same. Best half peck onion seed,	2
Same. Best half peck any other kind seed,	2
Same. Best collection small seeds,	5
J. W. McDowell, Dicksonburg, best half peck flax seed,	2
Same. Best half peck sample new seed,	2
John Dagett, Girard, best timothy seed,	2
C. Leet, twenty pounds hay,	3

J. ROBERT HALL,
THOMAS J. EDGE,
Committee.

CLASS XXVIII.—Collection of Agricultural Products.

T. Sprague, North East, best collection of Apples, not less than ten varieties, (exhibited by union of six persons,) first premium,	$10
J. W. McDowell, Dicksonburg, two bushels Timothy Seed, first premium,	10
I. S. Hubbard and five others, Fredonia, New York, collection, twelve varieties Native Grapes, second premium,	10
Same. Collection, six varieties Native Grapes, first premium,	5
C. Leet, Moorheadville, six bushels Red Wheat, first premium,	10
Same. Six bushels White Wheat, first premium,	10
Collection of Cumberland county farmers, six pecks potatoes, first premium,	8

C. M. REED,
HARRY IRISH,
D. N. PARKER,
Committee.

To the President and Executive Committee:

We, the undersigned committee appointed to review Class No. 28, beg leave to report that, after a careful examination, they find the awards correct, except in entry made by C. Leet, which premium we have cancelled.

D. H. BRANSON,
ABNER RUTHERFORD,
ISAAC MUMMA,
Committee on Revision.

CLASS XXX.—VEGETABLES.

James Hallman, Erie, display of Vegetables,	$10
S. J. Allis, Erie, twelve Carrots,	1
Charles Gaillard, Erie, twelve Turnips, (white,)	1
Same. Six stalks Rhubarb,	1
Professor Artemas Martin, Erie, twelve Peppers,	1
J. A. Moorhead, Moorheadville, three Garden Squashes,	1
Same. Three Field Squashes,	1
Same. Three large Watermelons,	2
Same. Three varieties Watermelons,	2
Same. Three Green Fleshed Nutmegs, (musk varieties),	2
Same. Three Yellow Fleshed Nutmegs,	2
George Perry, Erie, six Cabbages,	1
Henry Newmeyer, largest display of Vegetables, special premium,	5
E. T. Moorhead, Moorheadville, twelve Tomatoes,	1
L. H. Couse, Erie, twelve Parsnips,	1
L. P. Crouch, Girard, three Pumpkins,	1
John Eaton, Fairview, twelve ears White Corn,	1
Henry Deihl, Erie, six stalks Celery,	1
Charles Gaillard, Erie, twelve Beets,	1
J. W. Cox, Erie, twelve Yellow Corn,	1

J. W. HAMMOND, *President State Agricultural Society:*

Your committee upon Vegetables would respectfully report that the display this year was remarkably fine, and that while your committee should have wished to have extended premiums to several articles not enumerated in the list, for those enumerated, your committee has awarded according to merit to the best of their belief.

Respectfully,
JOHN MURDOCH, Jr.,
J. B. BOYD,
H. W. HOFFMAN,
Committee.

CLASS XXXI.—GRAPES, CIDER, CORDIALS, &c.

W. W. Eaton, Fairview, four bunches Concord Grapes, first premium,	$1
C. A. Leet, Moorheadville, Pennsylvania, four bunches of Delaware Grapes, first premium,	1
Same. Four bunches Iona Grapes, first premium,	1
Johnston Eaton, Fairview, one half peck Delaware Grapes, first premium,	1
Same. Fifteen varieties Grapes, first premium,	10
R. Baer, Fairview, one half peck Ives Seedlings, first premium,	2

Mrs. I. Wolf, Erie, two gallons Cider Vinegar, first premium,	$2
M. Mehl, Sr., Erie, one half peck Rebecca Grapes, first premium,	2
J. H. Tryon, Willoughby, Ohio, one half peck Isabella Grapes, first premium,	2
Same. One half peck Catawba Grapes, first premium,	2
Same. Four bunches Catawba Grapes,	1
C. Leet, Moorheadville, one half peck Delaware Grapes, first premium,	2
T. S. Hubbard, Fredonia, New York, best collection native Grapes,	5
S. M. Hertzler, Cumberland county, one bottle Strausburg wine,	2
Same. One bottle Raspberry Wine,	1
Ryckman, Day & Co., Brocton, New York, best Catawba Wine,	3
Same. Best Diana Wine,	3
Same. Best Blackberry Wine,	3
S. M. Hertzler, Cumberland county, display of spirituous liquors, special mention.	

JOHN H. ZIEGLER, *Chairman.*

CLASS XXXII.—FRUITS.

W. W. Eaton, Fairview, ten varieties Fall Apples, second best,	$3
Theodore Sprague, New Castle, best basket Quinces,	5
J. M. Spafford, North East, three varieties Fall Pears, best,	3
Berst Brothers, Erie, five varieties Winter Apples, second best,	2
R. M. Bonnell, Harborcreek, best five varieties Winter Apples,	5
A. Titus, Venango, arranged basket, six varieties, $6 and diploma.	
J. A. Moorhead, Moorheadville, best ten varieties Fall Apples,	5
R. T. Smith, Phillipsburg, ten varieties Fall Apples, diploma.	
M. Mehl, Sr., French Prunes,	2
Same. Reugel Green Gage,	3
Same. Three varieties of Pears,	2
N. L. Russell, Belle Valley, best three varieties Pears,	3
Philip Osborn, Girard, best basket, six varieties Apples,	6
H. T. Tryon, Willoughby, Ohio, best collection of Peaches,	10
H. T. Sprague, Millcreek, best Winter or Fall Pears,	4

The committee in making their report, desire to say that in view of the fact that the fruit crop in Pennsylvania has been limited this year, the display of fruit at the fair was very creditable, indicating more than ordinary attention to the cultivation of fruit in this section of the State, and they respectfully submit the foregoing as their awards of premiums and diplomas for the several varieties of fruit on exhibition.

L. A. MACKEY, *Chairman,*
JOSHUA DOUGLASS,
J. C. C. WHALEY,
M. W. McALARNEY,
Committee.

CLASS XXXIII.—Flowers and Designs.

H. T. Sprague, Erie, display Evergreens, second premium,	$5
Mrs. O. E. Perry, Erie, collection Asters, first premium,	2
Same. Collection Petunias, first premium,	2
Berst Bros., Erie, six varieties plants, second premium,	2
Same. Phio Dendrom,	2
Same. Nursery collection, first premium,	10
Same. Bedding and out-door decoration, second premium,	3
Same. Collection Roses, first premium,	2
Same. Pair head boquets, round, second premium,	2
Same. Pair stand boquets, flat, first premium,	3
Same. Basket with flowers, first premium,	2
Same. Fancy basket with flowers, second premium,	1
Henry Newmeyer, Erie, twelve varieties plants, second premium,	3
Same. Six varieties plants, first premium,	3
Same. Collection variegated leaf plants, second premium,	3
Same. Collection Fuchias, first premium,	2
Same. Collection Heliotrope, first premium,	2
Same. Collection Verbenas, first premium,	2
Same. Collection cut Dahlias, first premium,	2
Same. Collection Roses, second premium,	2
Same. Pair head boquets, round, first premium,	3
Same. Bridal boquets, first premium,	3
Same. Basket with flowers, second premium,	2
Same. Fancy basket with flowers, first premium,	2
Same. Vase with flowers, first premium,	2
Mrs. William Hinton, Harborcreek, cut Pansies, grown from Vick's seed, first premium,	2
Same. Rose Geranium, honorable mention, and an award of,	1
Same. Basket Everlastings, first premium,	3
Mrs. John McCrea, Erie, collection cut roses, first premium,	2
Same. Collection Tube Roses, first premium,	2
Same. Collection Geranium, first premium,	2
Same. Collection Gladiolus,	2
Same. New plants not shown before, first premium,	3
Same. New flowers not shown before, second premium,	2
Mrs. E. Gornflo, Erie, Rose Geranium, honorable mention and award,	1
Ernest Woeckner, Erie, twelve varieties flowers, first premium,	4
Same. New flowers not before shown, first premium,	2
Same. Variegated leaf plants, first premium,	5
Same. Bedding and out-door decorations, first premium,	5

Same. Collection Pinks, first premium,	$3
Same. Collection Pansies, in crocks, first premium,	2
Same. Collection Verbena Seedlings, first premium,	2
Same. Collection Phloxes, first premium,	2
Same. Collection Dianthus, first premium,	2
Same. Collection Aloes and Cactus, first premium,	2
Same. Collection pyramid boquets, first premium,	5
D. P. Crouch, Girard, two Geraniums, honorable mention and award of,	1
Miss S. Gensheimer, Fairview, Golden Japonica house plant, favorable notice and award,	1

The judges of Class No. 33, would respectfully report that the above is the unanimous report of the undersigned committee.

Mrs. I. B. GARA, *Chairman*,
FANNIE M. EBY,
Mrs. E. STUERZNICKLE,
SOPHY McCREARY,
Mrs. O. E. JONES.

CLASS XXXIV.—Stoves and Tinware.

H. M. Reed & Co., Erie, display of the "St. James" Cooking Range for families, bronze medal.	
H. M. Reed & Co., display of the "St. James" Ornamental Parlor Stoves, bronze medal.	
Chicago and Erie Stove Company, "Keystone" Range, with high and low closet, and reservoir, bronze medal.	
Same. Display of the "Nestor" Cook Stove, for coal and wood, bronze medal.	
Same. Display of the "New Forest King," for wood, bronze medal.	
Detroit Iron and Brass Company, best collection of hollow-ware,	$2
F. A. Stine, Cincinnati, Ohio, the "Dimminick" Fire Place Heater, the committee deemed very meritorious, and recommend a bronze medal.	
C. Flickinger & Brother, Erie, Ornamental Parlor Grate, for open fires,	5
Same. Display of Stoves, diploma.	
Coöperative Foundry Company, Rochester, New York, display of Parlor Oven Stoves, committee recommend a bronze medal.	
Johnson, Black & Co., Erie, "Radiant Home" Wrought Iron Furnace, first premium,	2
Same. "Radiant Home" Base-Burning Stove, bronze medal.	
Same. "Radiant Home" Hall Stove, bronze medal.	
Same. "Radiant Home" Ornamental Parlor Stove, diploma.	

H. D. Janes, Erie, Oil Stoves, deemed very meritorious.

D. L. Stiles, Rochester, New York, had on exhibition the "Czar" Base-Burner and Oven Stove, and the committee thought it deserving of favorable mention.

The committee to revise this class, at the request of a number of exhibitors, desire to report that they have made the above awards.

The display in this department was very fine, equaling, if not exceeding, that of any previous year. Having, in many cases, great difficulty in deciding on the merits and workmanship presented to them, all being of the very best.

Respectfully,

IRA TRIPP,
W. B. CULVER,
J. C. MORRIS,
Committee.

CLASS XXXV.—Glass, Cutlery, Lamps, etc.

C. Moemberg, Erie, two Ladies' Writing Desks, bronze medal.

Charles M. Spencer, Erie, display of Mantels, bronze medal.

A. H. Eastman, Erie, display of Colby's Improved Wringers, bronze medal.

Erie Washer Company, Erie, best display of Washing Machines, . .	$1

J. M. KUHN,
F. L. McLAUGHLIN,
S. E. KINCAID,
Committee.

CLASS XXXVI.—Cloths, Linens, Blankets, Shirtings, etc.

Margaret Oakes, Milton, Pennsylvania, best Rag Carpet, ...	$5
J. M. McDowell, Dicksonburg, Pennsylvania, linen sheeting, $5; linen diapers, $3; kersey linen, ...	2
J. N. Thompson, Jamestown, New York, best piece White Flannel, .	10
Mrs. J. A. French, best Hearth Rug, ...	5
Mrs. Orville Johnson, Erie, best Double Coverlet, ...	5
Lake Shore Woolen Company, display of Flannels, $10; Woolen Blankets, ...	5
Clinton Woolen Manufacturing Company, display of woolen cloth, .	5

J. R. CRAWFORD,
WILLIAM C. BAYLEY,
HENRY SOUTHER,
SAMUEL ADAMS.

CLASS XXXVII.—Quilting, Needle Work, Embroidery, etc.

Mrs. K. M. Mason, Erie, Pillow Shams,	$1
Mrs. Lottie Van Wick, Erie, Patchwork Quilt,	2
Miss Harriet Mix, McKean, Bed Quilt,	3
Miss Mary Bloeser, Erie, Needle Work, special premium.	
Mrs. Eliza A. Hall, Jamestown, pair Fringed Mittens,	1
W. McDowell, Dicksonburg, Pennsylvania, best Woolen Stockings,	1
Same. Best Homespun Woolen Yarn,	1
Dora Schultz, East Greene, Cotton Stockings,	2
Mrs. Amelia McNeal, North East, fine Shirt, made by herself when eighty-two years of age, diploma.	
Miss Agnes Moorhead, North East, Rag Hearth Rug,	1
Ella E. Miller, Erie, Machine-made shirts,	2
Mrs. R. Bear, Fairview, Coverlet, made of homespun yarn,	1
Mrs. C. Spence, Niceville, Child's Overdress,	2
Mrs. Catharine Ferrier, Erie, two Worked Chairs,	2
Susan Hooper, Erie, Lace Cards,	3
Mrs. T. D. McClelland, Erie, Knit Spread,	1
Mrs. Julia Streuber, Erie, Ottoman,	1
Miss Belle Holbert, Erie, Bead-work Pin Cushion,	2
Miss Mary E. Acheson, Erie, Embroidered Yokes and Sleeves,	2
Miss C. Zimmerman, Erie, Embroidered Skirt Yoke and Sleeves, Pocket Handkerchief, Neck-tie and Sleeves, and Cape, $1 on each article.	
Miss K. M. Mason, Erie, Camille Worked Slippers,	1
L. H. Couse, Erie, Delaine Bed Quilt,	1
Miss Belle Cross, Albion, Lady's Quilted Skirt,	1
Mrs. H. Janes, Erie, Delaine Bed Quilt,	1
Miss Frances Hall, Erie, eight pieces Point Honiton Lace,	2
Mrs. F. P. Bailey, Erie, Embroidered Lace Tidy,	1
Mrs. F. F. Adams, Lambrequin on Stand,	1
Mrs. T. McConkey, Erie, Embroidered Crape Box,	1
Same. Silk Sofa Pillow,	1
Same. Embroidered Foot Rest,	1
Mrs. Guy Loomis, Erie, White Quilt,	1
Mrs. John Abell, Child's Dress,	3
Mrs. P. D. Faulkner, Erie, Silk Bed Quilt,	1
Mrs. H. Keene, Erie, Embroidered Lace,	1
Mrs. Fannie Baker, Erie, Lace Work, diploma—special premium.	
Mary Brindle, Erie, one towel, (over one hundred years old,)	1
Mrs. L. A. Morrison, Erie, Embroidered Bead-Pin Cushion,	2

Miss Minnie R. Oliver, Worsted and Silk Embroidery, ...	$1
Mrs. E. A. Dumars, Centennial and Victoria Platter, ...	2

Respectfully submitted.

W. C. EVANS, *Chairman*,
Mrs. J. McCARTER,
Mrs. E. A. SIMONDS,
Mrs. W. W. DINSMORE,
Mrs. A. LEECH,
Mrs. R. J. SALTSMAN,
Committee.

CLASS XXXVIII.—KNITTING, CROCHET, AND SHELL WORK.

Miss Kate Freyermuth, Sterrettania, best Wreath Feather Flowers,	$2
Frank Henry, Erie, best specimen Shell Work, ...	2
Miss Lela Stone, Fairview, best Tatting, ...	2
Mrs. Malinda Keeler, Erie, second best Knitted Bed Spread, ...	1
Mrs. Doctor Ingersoll, Erie, best Sea Moss, ...	1
Miss Kate Hunter, Erie, best large Carriage Afghan, ...	2
Miss Rose Whitney, Erie, best Tidy, ...	1
Miss Ida Jones, Erie, best three pieces Spatter Work, ...	2
Mrs. J. Hickernell, Erie, best Agricultural Wreath, ...	1
Miss Jennie McKinney, Erie, Spatter-Worked Cross, ...	1
Joseph H. Kolb, Erie, Knitting, ...	1
Emily Hartsgrove, Erie, best Hair Work, ...	2
Miss I. Olds, Erie, best Netted Shawl, ...	2
Miss K. M. Mason, Erie, best Crochet Shawl, ...	1
Miss Frankie Thorn, Erie, best Child's Zephyr Sack, ...	1
Mrs. S. R. Eaton, Fairview, second best Cotton Tidy, ...	1
Mrs. May Turner, Erie, best Tidy, ...	1
Mrs. Joshua Douglass, Meadville, second best two Afghans, ...	1
Mrs. H. Keene, Erie, best display of Wax Work, ...	2
Mrs. Thomas McConkey, Erie, best Child's Afghan, ...	2
Miss. S. M. Jones, Erie, best fine Knitting, ...	2

To the Executive Committee of the Pennsylvania Agricultural Society:

The undersigned, committee of judges of articles comprised in Class No. 38, respectfully report, that they have made careful examination of all the articles named in above class, which were found on exhibition, and have awarded the foregoing premiums to the persons named.

HENRY BUTTERFIELD, *Chairman*,
Mrs. R. W. RUSSELL,
Mrs. F. F. MARSHALL,
Mrs. R. E. CLEMENS,
Mrs. JOHN E. PAYNE,
Committee.

CLASS XXXIX.—Bread, Cakes, Pastries, and Meats.

J. W. McDowell, Dicksonburg, Pennsylvania, best home-made rye bread,	$2
Mrs. S. B. Durlin, Erie, best wheat bread,	2
Mrs. William Hinton, Harborcreek, best doughnuts,	1
Same. Best Lemon Butter,	1
Mrs. W. W. Eaton, Erie, best rusks,	1
Mrs. H. S. Jones, Erie, best brown bread,	1
Mrs. T. McConkey, Erie, best sponge cake,	1
Same. Best Lemon Cake,	1

Mrs. J. M. BRYANT,
Mrs. P. CROUCH,
Committee.

CLASS XL.—Preserves and Spiced Fruits.

Mrs. D. Mason, Erie, best collection of Pickles,	$1
A. D. Strong, Ashtabula, Ohio, best Apple Jelly,	1
Mrs. D. S. Clarke, Erie, best Canned Cherries,	1
E. R. Eaton, Fairview, Quince Jelly,	1
Mrs. J. Taylor, West Millcreek, collection of Preserved Fruits,	5
Same. Display of Pickled Fruit,	6
Mrs. E. M. Bessey, Girard, Canned Fruit,	5
Mrs. C. P. Sprague, Millcreek, Canned Corn,	1
Mrs. E. W. Reed, Erie, Canned Pears,	1
Mrs. P. D. Faulkner, Erie, Spiced Peaches,	1

The committee, to whom was entrusted the examination and awards, in Class No. 40, have endeavored to fulfill that duty to the best of their judgment, the result of which is given in the preceding awards and notes.

They also desire to say, although the display for size is not large, every article in the collection is entitled to some consideration at their hands, as there are none but possess greater or less merit.

Respectfully,
A. D. LEVERING, *Chairman*,
Miss SARAH A. REED,
Mrs. THOMAS McCONKEY.

CLASS XLI.—Fine Arts and Penmanship.

W. A. Morand, Erie, best collection of photographs, bronze medal.	
Wager & Crowell, Erie, second best display of plain and colored photographs,	$3
M. L. Hubbard, Erie, best specimens of ornamental penmanship.	

Miss Etta L. Miller, Erie, oil paintings, complimentary notice for pair of cabinet, (historical,) paintings in oil.	
Miss Annie L. Zimmerly, Erie, paintings, best single specimen in water colors,	$3
F. Curtze, Erie, complimentary notice for plaster head of Christ.	
Miss H. F. Dunn, Miles Grove, complimentary notice for eagle in pastel.	
George Senyard, Girard, best portrait in oil,	3
Same. Complimentary notice for two pieces of fruit in oil.	
Same. Best animal painting,	3
Mrs. Dr. Ingersoll, Erie, best colored photographs,	2
James S. Miller, Erie, best collection of pen drawings,	3
Miss Carrie Gunnison, Erie, best pair heads in oil, second premium,	2
Mrs. P. B. Chapin, North East, painting, best specimen by any one who learned to paint when over sixty years old.	
Austa Densmore, Meadville, best display of water colors,	3
John Q. A. Walker, Union, favorable mention for collection of portraits.	
R. E. Hayt, Erie, water color paintings executed when eleven years old, favorable mention.	
Miss Emma Gunnison, Erie, favorable mention for specimen of painting.	
Miss Ella Douglas, Meadville, first premium, three dollars, for best flowers in water color from nature.	
Miss Hattie Landon, Erie, best pencil drawings,	1
Miss Ethel Stern, Erie, best single specimen of crayon,	1
Miss S. M. Jones, Erie, favorable mention for tasteful arrangement of pictures.	
Miss Lydia Mosher, Erie, complimentary notice.	
Thomas Walsh, Scranton, best penmanship, diploma.	

Miss MARY J. PAULI,
EBEN BREWER,
Committee.

CLASS XLII.—Silverware, Pianos, Sewing Machines, &c.

Burdett Organ Co., Erie, display of Organs, diploma.

Derrick & Felgemaker, Pipe Organ Co., Erie, diploma.

W. A. RUPERT,
JOHN WARMOLD,
Committee.

CLASS XLIV.

American Fusee Co., Erie, Safety Matches, diploma.

P. G. Finn, two Saw Gages, honorable mention.

J. R. Kidder, Albion, model Shingle Shaving Machine, diploma.

T. M. Foster, Union City, model patent Ventilator, honorable mention.

Erie Mitreing Co., Wood-Cutting Mitre, diploma.

E. J. Cowell, Erie, Backus Water Motor, diploma.

Elmer Green, North East, Window and Outside Blinds, honorable mention.

Horatio Andrews, Fredonia, New York, Wheel Excavator, diploma.

Exhibition Show Case Co., Erie, Parasol Case, diploma.

Theo. Hersch, Erie, Hand-made Bird Cage, diploma.

H. M. Reed & Co., Erie, Sickle Grinder, honorable mention.

Wheeler & Wheelock, Erie, Iron-Anchored Fence, diploma.

L. L. Deming, Erie, patent Spring Bed Bottom, honorable mention.

Nichols & LeFever, Breach-loading Shot Guns, bronze medal.

F. J. Balkins, Erie, Streeter's Magic Fluting and Polishing Iron, diploma.

Silas Grarelle, Media, Ohio, Sash Cord Anchor, diploma.

O. C. Z. Schneider, Erie, Waterproof Dressing, diploma.

William J. Sell, Erie, Japanese goods, fine display.

Erie Tile Co., Drain Tile, honorable mention.

J. A. Treat, Cleveland, American Carriage Gate, diploma.

S. A. Anderburg, Scroll Sawing, diploma.

John Weazel, Revolving Gate, diploma.

A. Bradish, Fredonia, New York, Little Giant Fire-Fighter, bronze medal

W. H. EGLE, *Chairman*,
M. H. SILVERHORN,
T. J. DEVOIR,
A. B. GUNNESON,
Committee.

REPORT OF THE EXHIBITION AT ERIE.

"We have been obliged to refuse to enter several fine herds of cattle. The entries in all departments more than exceeded our anticipations. All departments are full, and the display of stock will be the finest ever seen in this State. With good weather, it will be the most successful exhibition the Society has ever held."

Thus spoke the Recording Secretary of the Pennsylvania State Agricultural Society to a *Dispatch* reporter. This is good news. If the clerk of the weather will keep his rain barrel corked for five days, he will do a most commendable thing, and receive a hearty vote of thanks.

During Saturday the exhibits arrived thick and fast, and yesterday a scene of unusual activity was presented on the grounds. Exhibitors were getting their articles in position, and a large gang of workmen were doing needed and necessary work.

Several engines and boilers are in place at machinery hall. The remainder will be in order before to-night.

Grain-drills, reapers and mowers, corn-cutters, threshing-machines, wagons, buggies, carriages, stoves, and hundreds of other articles, are already on the grounds in profusion. Everything, as far as possible, will be put in its proper place to-day.

The first herd of cattle arrived on the grounds Saturday. They are fine-looking animals, and came from Kentucky.

Mr. Edward Ashbridge, the well-known breeder of Chester White pigs, arrived from Chester county Saturday, with thirty-four fine animals, ranging in age from the wee little porker to the full-developed pig.

The motive power of machinery hall is furnished by three engines, from the Bay State Iron-Works. A trial was had of the power on Saturday, giving the utmost satisfaction.

The grand review of stock will take place on Wednesday afternoon. The animals will be marched around the race-track. It will be a most interesting sight for our farming people.

The offices of the Association will be removed from the city to the headquarters in the club-house, on the grounds, this morning. The superintendents of the various departments will have offices in their respective buildings. Mr. Allen, the superintendent of the stock department, has his office in what used to be the kitchen of the club-house.

Several trotters and fine stallions arrived on the grounds Saturday.

Several refreshment stands have been erected at convenient points.

If you want a dinner, remember that the dining-room is run for the benefit of the Home for the Friendless.

The Erie and Pittsburg Railroad Company will run special trains, starting from Peach street, to the grounds every fifteen minutes.

Space has been assigned all the exhibitors, and all are busy arranging their displays.

Nearly all of Erie's manufacturing establishments will be represented. Competition in all the classes will be very lively.

The judges on the committees for the State Fair are requested to report for duty at the President's office, on the grounds, this afternoon, or early to-morrow.

There will be no races to-day. Good trotting to-morrow. The track is in splendid condition.

Six of the State Fair police were on duty yesterday. Chief Mitchell will establish his office on the grounds to-day.

This will be a busy day upon the Fair grounds. The stabling of stock, the sound of hammers in the Home department, the arrangement of fruits, vegetables, cereals, flowers, etc., puffing of fifteen engines, and the rattling of machinery, will make it a time to be remembered. All the departments, in fact, will be active, and we can assure persons, from what we have seen, that they will be well repaid for their time in attending.

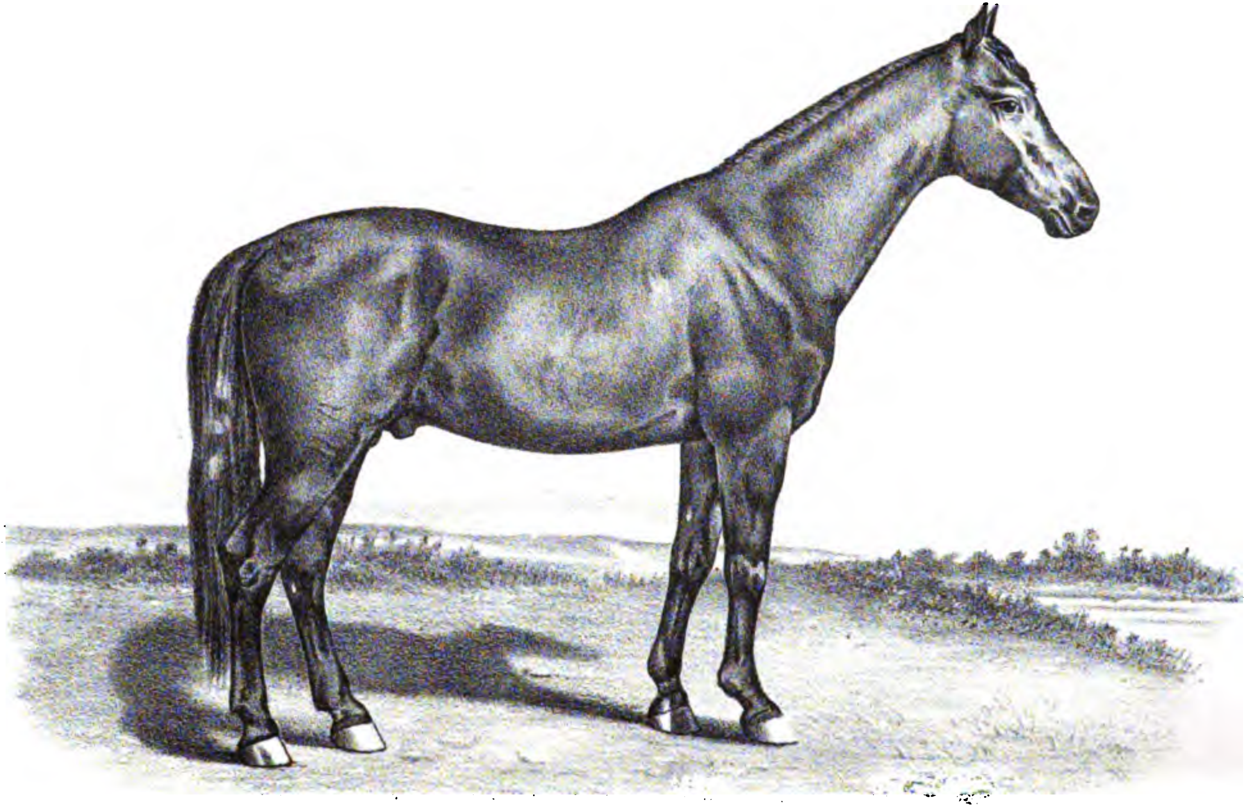
MONDAY—FIRST DAY.

The twenty-fourth annual fair of the Pennsylvania State Agricultural Society was inaugurated in this city yesterday. The weather was very fine, with a warm sun, and no prospect for a change for several days to come.

A considerable amount of stock and machinery, as well as numerous miscellaneous articles, arrived on the grounds Saturday, and the lists were considerably swollen by the arrivals of yesterday, which, by the way, were not concluded when the hour of closing up arrived last evening, the exhibitors coming in with their property by wagon and by rail.

As has been before stated, all the stalls and pens upon the grounds have been taken, and the management have been assured that all will be filled, but that some of the exhibitors, particularly of stock, did not promise to be on hand until to-day. Indeed, the reporter saw several home exhibitors, who, being only partially represented yesterday, assured him that every niche and corner contracted by them would be filled to-day.

At an early hour in the morning exhibitors in all the departments re-



BLUMSBURG

BLACK BASHAW

Property of Chas. L. Sharpless, *Chilton Hills, Pa.*

UNIV. OF MICH.

paired to the grounds, to begin the day's work in arranging their articles and effects, and making room for other lots that were yet to come.

Several car-loads of machinery of various kinds came in during the day among which were cargoes of agricultural implements, engines and boilers, etc., etc., and by evening almost everybody in the enclosure, and the number in attendance was quite large, was busy in the assorting of articles, getting machines together, wheeling stoves into line, ornamenting and filling up booths in the home department, arranging floral and vegetable products, etc.

THE OFFICERS' HEADQUARTERS

Are in the Club House, the President's office, on the west side of the hall, the office of the Secretary on the east side, and the office of the Superintendent of Stock, in the back portion of the building. Each room is convenient, easy of access, and particularly well adapted for the purpose to which it has been selected.

THE STOCK DEPARTMENT

Contains some of the finest displays of horses, cattle, sheep, and swine, that have ever been upon examination in this State; indeed, not a little of the stock was at the Centennial Exposition last year, and drew first premiums, diplomas, &c.

THE HOME DEPARTMENT

Contains very many meritorious displays, made up of costly furniture, highly finished pianos and organs, elegantly wrought bed-quilts, spreads, and counterpanes, needle-work, embroidery, oil paintings, chromos, photographic displays, sewing machines, wonderful exhibitions in taxidermy, geodetic, and fosilliferous specimens; extensive displays of dry goods, books, stationery, boots and shoes, scales, and a great many implements and articles contributed by our citizens and people of the neighboring towns.

THE STOVE DEPARTMENT

Is largely represented in first-class goods, in the line of heaters, cooking ranges and stoves, parlor stoves in endless profusion, and we may say with truth, that the exhibit in this department excels that of any other fair that was ever held by this or any other society in the State.

MACHINERY HALL

Contains engines of various patterns and capacity; saw-mill rigs, cider mill in full tide of operation, scroll saws, planers, lathes, and various other machines, too numerous to mention. Among

The Agricultural Implements

Are found a large exhibit of mowers, reapers, grain drills, horse-rakes, an unusually large line of plows, embracing many handsome patterns, harrows, horse powers, farm gates and fences, stump machines, hay presses, and very many other things.

The Carriage Department

Makes a most excellent show of carriages, phætons, buggies, farm wagons, express wagons, &c., &c.

Floral Hall

Is well represented with greenhouse plants and shrubbery, and the floral outlook was never better. Within this building is a handsome fountain, and the interior arrangements are particularly fine. In front of the building are

Vegetables and Fruits,

Which are exceedingly nice, probably never finer at any exhibition anywhere. Apples, pears, peaches, and the like, are unusually large and enticing, grapes are luscious, and potatoes, turnips, beets, carrots, parsnips, cabbage, and other "garden sass" are remarkably fine. One gentleman exhibits a vine upon which have matured, and to which still cling, seven golden pumpkins.

The Dining Hall

Is conducted in the interests of the Home for the Friendless, and was well patronized yesterday. The lady managers were exceedingly attentive, and the viands were most excellent, and we can assure parties attending the fair that they can find no better or agreeable eating-house than the "Home."

THE RACES TO-DAY.

Entries First Day, Tuesday, September 25.

3:30 class—$60 to first; $30 to second; $20 to third; $15 to fourth.

1. James Clark, ch. h. Bonnie.
2. D. M. Green, ch. m. Imogene.
3. George B. Moore, br. g. Pete.
4. John Shillinglaw, br. g. Northern Spy.
5. John Johnson, b. m. Kittie Johnson.

Race for all colts or fillies foaled since 1872—$40 to first; $20 to second; $15 to third.

1. R. A. Stratton, ch. s. Hull.
2. H. Mellon, gr. f. Noontide.
3. E. M. Cooper, s. m. Kittie Cooper.
4. A. J. Cooper, b. m. Gail Hamilton.

Special Purse.

The managers of the Association have increased the attractions of Wednesday's sport by offering a purse of $100, for horses that have never beaten three minutes, owners to drive. This is in addition to the races advertised for Wednesday.

The following comprises the list of entries made for this race:

Special race for horses that have never beaten three minutes—$40 to first; $30 to second; $20 to third; $10 to fourth.

1. R. W. Russell, b. m. Kitty.
2. J. C. Hart, g. h. Jim.
3. R. J. Saltsman, g. m. Sylph.
4. J. B. Wadsworth, Billy Blood.
5. J. M. Prendergast, b. m. Dorsey.

Charles Inguss, b. g. John the Baptist.

Entries.

The entries for the races to be trotted on Wednesday and Thursday, will close at the Reed House office at 10 o'clock, to-night.

TUESDAY—SECOND DAY.

The second day of the fair opened bright and beautiful. Probabilities has thus far furnished a splendid article of weather, and has, by his unlooked-for generosity, made more friends than he will lose in a month. The sun shone brightly all day, and its rays, although rather warm, were most welcome. The clear sky and warm sun, on the opening day, prophesied a continuance of the fine weather during the remainder of the fair.

The grounds were a scene of unusual activity. Several car-loads of machinery had arrived during the night, and squads of men were hard at work getting exhibits into position. Nearly forty additional head of stock from abroad were added to the exhibition, making the live-stock display decidedly the most extensive ever shown on the Erie grounds.

Mr. Dan T. Tracy, of this city, exhibits thirty head of fine-blooded cattle. Mr. Tracy has as fine stock as is raised in this country.

INCREASING THE ATTRACTIONS.

Numerous additions were made during the day to the various departments. This was particularly noticeable in the home building, which is, as it should be, one of the most attractive features of the fair. The display of fine arts is rather small, but some of the pictures on exhibition are choice, and make up by excellence what would be lost by a large but poor show.

MACHINERY HALL.

Some little time before noon the machinery was put in motion. The motive power was furnished by two engines from the Bay State Iron-Works. During the afternoon large crowds visited Machinery Hall. Everything in this department, with the exception of one or two newly-arrived engines, is in fine trim, and the managers of the fair have reason to congratulate themselves on the fine display made. The Stearns' Manufacturing Company and the Bay State Iron-Works, each, have fine displays of engines.

THE BOOMER & BOSCHERT CIDER PRESS.

In the extreme north-east corner of Machinery Hall is located this renowned cider press—doubtless the best in the market. As this press has been pouring out volumes of the juice of the apple since the fair opened, most of those in attendance will vouch for the purity of its production. It received the highest premium at the Centennial, where it eclipsed all competitors.

THE RAILROADS.

The excursion trains, which ran over the various railroads, brought in a limited number of visitors to the fair. A large crowd, however, was not expected. To-day and to-morrow will be the days when our country friends will come flocking to the city, and the railroads will, undoubtedly, do a good paying business. The fair is well worth seeing.

MUSIC.

Knoll's full band discoursed sweet music, from the club-house veranda, during the morning, and in the afternoon occupied the band-stand in the park. This idea of having music on the grounds every day is very creditable, and shows that the managers are doing all in their power for the entertainment of their numerous visitors.

ERIE'S TURN-OUT.

Our citizens turned out very liberally yesterday, many taking their families. We should have liked to have seen more persons on the grounds. However, it is believed that there will be a large and increasing attendance during the remaining three days of the fair.

A visitor, desirous of

REACHING THE GROUNDS,

Has good facilities for making the trip. Arriving at the Union depot, he will only have to walk a block, to reach the corner of Peach and Twelfth streets, from which point special trains are run to the grounds every fifteen minutes by the Erie and Pittsburg railroad. The fare for the trip each way is ten cents. Passengers, taking these trains, have only a few steps to take to enter the grounds. A ticket-office has been established on the northwest corner of Twelfth and Peach streets. If you want to ride in a band-wagon or carriage, you can, at this point, ride to the grounds for ten cents. The city hackmen have purchased badges entitling them to drive on to the grounds, and will deliver passengers inside for twenty-five cents. The trains make the trip in about four minutes, and are entirely free from dust and discomfort. It is decidedly the best way of making the trip.

WHERE TO GET YOUR MEALS.

The dining-room on the grounds is managed and run in the interest of the Home for the Friendless. If you are hungry, and feel the necessity of a good, square meal, for a reasonable price, be sure and patronize the "Home Dining-Room." The young ladies are ready, nay, anxious to serve you. Yesterday was the young ladies' day, and the dinner was very good. The bill of fare comprised chicken pot-pie, chicken salad, cold meats, pork and beans, delicious bread and butter, celery, pickles, several kinds of pie, tea, coffee, grapes, and canteloupes. Hotels couldn't treat you better. Dinner tickets, fifty cents. The young ladies invite you to patronize their tables. If you do not want a dinner, you can secure a lunch at the Home lunch-table.

ESPECIALLY NOTICEABLE.

The departments especially noticeable are those of machinery and stock. The fruit and vegetable kingdoms yielded their choicest treasures, and the display in this department exceeds by far any ever seen in this section. A half acre or more of ground is occupied by mowers, reapers, harvesters, grain-drills, plows, corn-shellers, &c. In this there is enough to move the average Pennsylvanian to a feeling of pride, which will be deepened by the superb display of stock.

FRUITS AND VEGETABLES.

The visitor can pass an hour or two very pleasantly in the fruit and vegetable hall, admiring the display, and wondering at the eccentricities of nature in allowing her products to take such queer shapes. This department is well calculated to impress the tillers of the soil, and is with them a favorite resort.

Our reporter, note-book and pencil in hand, took a stroll through this hall, and some of his jottings appear below.

Mr. Daniel Shelly, of Shiremantown, is the superintendent of this department, and has displayed good taste in arranging the exhibits. The south side of the hall is devoted entirely to vegetables, and every available inch of space is filled.

Mr. Henry Diehl shows four large cucumbers, the average length of each being four feet. He also has a good display of other garden products.

Professor Artemas Martin exhibits a basket of large red peppers and fine specimens of sweet and pop corn.

Mr. C. A. Leet has a fine assortment of vegetables, prominent among which are one dozen big mangel wurzel beets and some large potatoes. He also has an extensive display of grapes.

Two mammoth sugar trough gourds, raised by James Hallinan, attract attention. His selection is unusually good, and comprises some fine specimens of field turnips and potatoes.

The potatoes particularly noticeable are of the Early and Late Rose, the Peerless and Victor varieties. The Murphies fill seventeen bushel baskets, besides several baskets.

Grapes of all varieties, with fruits of all kinds, and jellies and canned goods, fill the center tables and the north side of the hall.

Mr. J. A. Moorhead, of Moorheadville, exhibits a monster squash that is ticketed " weight 174 pounds." He also has a fine display of watermelons, canteloupes, pumpkins, beets, and other field and garden products.

A fig tree, with twelve partially ripened figs, grown in Erie, occupies a position near the eastern entrance. It is owned by Mrs. G. W. F. Sherwin, of this city.

Messrs. J. B. Crouch & Co., and Crouch Brothers & Co., exhibit several brands of their best flour.

Among the curiosities in this department may be mentioned a vine of grapes about ten feet long, on which are nearly seventy bunches of grapes.

" That is monstrous tall corn, aint it neow ?" drawled a sturdy granger eyeing severals stocks of long-legged corn in the eastern end of the hall. " A feller must get on a step ladder to pick them ere ears. Twenty feet high, eh ? Three ears to a stock. Jewwhittaker ! Dad can't grow anything like that ere," and he went on lost in amazement. The stocks were not all of the same height. The tallest must have reached up into the air about twenty feet. It was tall corn.

FLORAL HALL.

Never before in the history of the Society has there been such a fine display of plants and flowers. The tables on the north and south sides of the hall are filled to repletion with choice pot plants and flowers of all kinds and description. The center tables are devoted almost exclusively to choice potted flowers. This department is one of the most attractive features of the fair.

Mrs. William Hinton has on exhibition a finely trained rose geranium. The plant is about six feet high. Mrs. H. also shows a fine basket of everlasting flowers, a selection of pansies, asters, and other sweet flowers.

Mrs. O. E. Perry, besides some cut flowers, displays sixteen cages of canary birds.

Mr. Ernest Woeckner, the florist and horticulturist, occupies the north half of Floral Hall, and exhibits about 1,000 plants and flowers. On the center table, next to the fountain, he shows a tree with a Latin name long enough to knock off apples. The reporter tried to spell it, and nearly broke his jaws in the attempt. Suffice to say, it is a tree about three feet high, with sweeping branches and palm-like leaves, measuring about six feet across the top. It blooms every winter, and produces only one flower. The flower last winter was two feet and ten inches in length, and eight inches broad across the top. In appearance it resembles a calla lily.

The Berst Brothers occupy one half of Floral Hall on the north side. Among the noticeable plants are a tree fern, several canna plants, and a curious tree from the West Indies, known as the Phileo Dendrom. It bears flowers every year, and also a cucumber-like fruit, which ripens every two years. The leaves are narrow, and cut up worse than a fashion supplement. This tree also has a queer way of throwing out roots.

Mr. Henry A. Nemeyer occupies two thirds of the south side of Floral Hall, and exhibits nearly 1,500 choice plants and flowers.

THE STOVE DEPARTMENT.

The display of stoves and ranges is so large and varied, that the most exacting cannot find cause to complain of this most interesting department. One of the most gratifying results of this exhibit, is the fact that Erie manufactories take the lead. Erie produces as good stoves as were ever put upon the market.

Messrs. Tibbals, Shirk & Whitehead, the well-known and enterprising proprietors of the extensive stove-works, on the northwest corner of Twelfth and Sassafras streets, known to the trade as the

CHICAGO AND ERIE STOVE COMPANY,

Have on exhibition no less than forty stoves of their manufacture. It was intended at first to exhibit seventy-two stoves, but lack of space prevented the display only about one half. The stove this firm take delight in showing is the "Invincible," without doubt one of the finest parlor heaters ever invented. It was first manufactured this year, and has sold very rapidly wherever introduced. The stove is elegantly finished, is nickel-plated, and is useful as well as ornamental. At the State fairs held in Wisconsin and Illinois, this month, the "Invincible" carried off the first premium in both instances, thus showing that it is appreciated in the western States. Visitors to the fair are cordially invited to call at the stove department and inspect the superb display made by this company. We should glory in our home manufactures, and extend all possible aid to sustain them. The display of the "Invincible" includes three sizes plain, and two sizes with ovens. Water heating attachments are made to fit either size. Next to the "Invincible" comes the "Keystone Range." Seven varieties are exhibited. The "Keystone Range" has the merit of being a good baker and using little fuel. This company also show ten varieties of wood burning, also several of their ordinary cooking stoves. The "Invincible" and all the stoves manufactured by this company, are for sale at the hardware store of Patterson & Brother, No. 917 State street.

The standard and reliable stove works of

JOHNSON, BLACK, & CO.

Are another bright light in Erie's galaxy of manufactories. Who has not heard or read of the "Radiant Home," conceded by all to be the hottest stove manufactured? At the Centennial Exposition it was the only parlor heating stove that received an award. This firm believe that stoves were only intended for heat, and have devoted all their energies to the manufacture of a stove that will not only heat a room comfortably on the coldest day, but make the room as warm as in midsummer. They have succeeded beyond their expectations. The "Radiant Home" has enjoyed a large sale. The Centennial Commission, in their award, spoke in the highest praise of the superior heating capacity of the "Radiant Home," the manner of construction, for purpose of equalization of heat, and the easy and effectual method of getting rid of debris. It is an admirable stove, and the three in operation in the west end of the building, keep the atmosphere away above the nineties. If you don't believe this, call and see how it is yourself. The motto of this firm seems to be "Red Hot," and hot it is. Johnson, Black & Co. also have in operation, just outside the west entrance to the building, three of their "Radiant Home base burning furnaces." All three give forth great heat. One is of wrought iron, and the other two are new tubular furnaces. W. W. Pierce & Co., 719 State street, have entered these stoves, and always have a full stock at their extensive store rooms.

STOVE SPLINTERS.

The South Erie Iron-Works show four of their ordinary cooking stoves.

The Coöperative Stove Company, of Rochester, New York, exhibit four fine parlor stoves known to the trade as the "Crown Jewel."

Mr. H. D. Janes, of this city, exhibits two specimens of the Peerless oil stove. These stoves are on the same principle as the student lamp.

Messrs. H. M. Reed & Co., make a superb display of an elegantly finished nickel-plated stove known as the "St. James." It is impossible to speak of these stoves at length in this issue, and further comment is deferred until to-morrow. Call and see the stoves.

C. Flickinger & Co., of this city, exhibit the fine parlor stove, the "Argand," manufactured by Perry & Co., Albany, New York.

COOLEY'S PORTABLE CREAMERY.

Aside from stoves of all varieties and makes, we found a space taken in the stove department for the exhibition of Cooley's Portable Creamery, to which we would call the attention of our dairymen, and all interested in "gilt-edged butter." Mr. J. W. Dorsey, agent for the Vermont Farm Machine Company, Bellows Falls, Vermont, is here for the purpose of introducing the creamery and explaining its superior points. The operation is simple, perfect, and quick. The milk is put into cans eight and one half inches in diameter and twenty inches deep, and holding about five gallons. These cans are entirely submerged in water, which is reduced to an average temperature of forty-five degrees. The operators will guarantee to raise all the cream in twelve hours, or between milking, and to make as good butter *in dog days* as in June or October. If this system will do all is warranted to do, it seems to us a great revolution in the manufacture of butter. Every dairyman should examine this creamery in the stove department.

THE HOME DEPARTMENT.

The favorite place of resort with the ladies is the Home department. The display is fine and very creditable.

On entering the building at the eastern entrance the visitor comes to the display of the Forsyth Scale Works, of this city. There are eleven union scales, six platform scales, nine confectioner's scales, warehouse, hotel, and store trucks, manifold presses, and a card of wrought iron goods. A two thousand pound pound; scale stands ready to weigh visitors.

Among the notable articles are several specimens of oil painted photographs, entered by Mrs. J. E. Becker; a collection of sea mosses from Buzzards Bay entered by Mrs. Doctor Ingersoll; a number of knitted quilt coverlets, patch-work quilts, fine embroidered work. Mrs. I. Hickernell shows a tasteful agricultural wreath in a frame, made up of fruits and cereals. Theo. Hersch, shows a large two-story bird cage, gotten up in elegant style in the form of a two-story dwelling-house, with fence, &c. The observatory is provided with a chime of bells and a weather vane.

William F. Wittich has a fine display of taxidermy. Will B. Graham shows an elegant assortment of fine stationery. Frank Henry, the lighthouse keeper, two what-nots, the entire surface of which is covered with shells, pebbles, and stones gathered on the beach. A fine display is made, by Mr. A. B. Cook, of Locke's gelatin starch.

The Clinton Woolen Company have a fine exhibit of cassimeres. The Erie Boot and Shoe Company make a large display of boots and shoes of their manufacture. Wagner & Crowell have a large exhibit of photographs. The west end of the hall is ornamented with samples of zephyr work. Two finely wrought chairs attract attention on the center dais near the west end. They were worked by ladies without patterns, and are fine specimens of work. John Q. A. Walker shows several fine oil portraits. The Keystone Coffee and Spice Mills, samples of spices, &c. The Lake Shore Woolen Company, of Fairview, make a fine display of home-made cloths.

Mr. James S. Miller, the draughtsman, exhibits a well-executed perspective of the splendid residence of Hononable John W. Hammond, the president of the Pennsylvania Agricultural Society.

Messrs. Stark & Franz, the furniture dealers, exhibit a handsome parlor set.

Chr. Momberg has two elegant writing desks, one valued at $200, and the other at $100.

The Derrick and Felgemaker Pipe Organ Company come next, with a large organ.

William J. Sell exhibits a case of fine Japanese goods.

MORAND, THE ARTIST.

Mr. Morand, the artist and photographer, whose fine crayon work has attracted considerable attention, and who has achieved quite a reputation as a fine photographer and worker in India ink, displays in the Art Gallery, in the eastern end of the home department, an elegant lot of cabinet photographs, both plain and colored; also, a large and finely executed life-like crayon portrait of an Erie citizen, Mr. E. Diefendorf. By the side of this picture hangs a natural and truthful crayon portrait of Miss L. Carter. The work in these two pictures shows high artistic taste and good judgment. Mr. Morand is an artist as well as a photographer, and executes all his work himself. Visitors are invited to call at his parlors, No. 23 and 24 North Park Row.

FINE MILLINERY.

The Misses Magill & Siegel, two of Erie's youngest and most enterprising milliners, have on exhibition, on the north side of the home department, a case of ladies' choice hats, just too lovely for anything. The ladies all stop and admire the stylish head gear, and go away with a burning desire to possess a hat of the same quality. The young ladies are to be congratulated on their enterprise. Their store is located at No. 726 State street, in the Jarecki Block, on the second floor. Lady visitors to the fair are invited to call and examine their stock.

FRENCH & McKNIGHT.

As you enter the home department, you come to the elegant display of teas, coffees, spices, sugars, canned fruits, &c., made by the well-known firm of French & McKnight, the retail grocers. The exhibit is very complete, is tastefully arranged, and is generally admired. This firm has the sole agency in Erie for the celebrated brand of Java spices which are manufactured by Pinckney, Jackson & Co., London. They also show fine honey, luscious raisins, and dried fruits. This firm also has the agency for a fire-kindler for coal fires.

THE BURDETT ORGAN COMPANY'S

Niche, in the home department, was filled by four splendid instruments, the first being a chapel or school organ, with fifteen stops; the second a concert, grand, or church organ, with twenty stops; while the third and fourth were parlor organs, one being supplied with a fanciful carved mirror top, and the other with a plain top, each finished in the highest style of art. The power and tone were demonstrated by an operator, who delighted the passing crowds with frequent performances thereon. These organs took the first premium at the Centennial, and also at numerous State fairs throughout the Union. The instruments are so well and favorably known that they do not require an extended description at our hands.

J. A. EICHENLAUB.

Prominent in the boot and shoe business in Erie is the man above named. You will find his fine exhibit on the north side of the home department. It comprises one round case of childrens shoes, of all grades, from the fine white kid to the coarser and humbler leather. Also a case of the celebrated Burt shoes for ladies and gentlemen, besides a good display of custom made work. Mr. Eichenlaub's place of business is at No. 628 State street.

CAVALCADE OF STOCK.

This morning, at eleven, all the stock on exhibition, with the exception of hogs and sheep, will pass in grand review around the race-track. Do not fail to see the grand cavalcade. It will be well worth going to see.

MISCELLANEOUS.

In our article on the home department, omission was made of the display of the American Fusee Company, T. Hallonfield's fine exhibit of taxidermy, comprising twenty-three cases, and Louis Streuber's display in the same art.

They are selling Lawrence canes in machinery hall. The sticks are turned and finished there.

The committee on fine arts will meet at the president's office, at ten o'clock, this morning, for business.

General H. L. Brown, the chief marshal, has for his assistants George Dunn and Kennedy King, an efficient trio.

The police arrangements are perfect. Chief Mitchell has under him trusty and competent men. Several fellows that scaled the fence were promptly arrested, sent to the city, and fined by an alderman. Fence jumping is apt to turn out a dear amusement.

There are some extraordinarily large specimens of squash, cucumbers, beets, turnips, and potatoes, and the display of small fruits is fine, but, as Josh Billings says, "They do not attract much sympathy. What the people hanker for is a purely agricultural hoss trot."

THE RACES.

The feature of yesterday afternoon was the races. In the 3.30 race there were six starters. It was easily won in three straight heats by the brown gelding, "Pete," an eastern horse, which was only allowed to trot under protest. We append the

SUMMARY.

ERIE, September 25.—Purse, $225; 3.30 class.

George B. Moore's br. g. Pete,	1	1	1
D. M. Green's ch. m. Imogene,	2	2	2
Charles M. Reed's b. g. Northern Spy,	3	3	3
—— —— br. g. Towanda Jim,	4	4	4
John Johnson's b. m. Kittie Johnson,	5	5	dr
James Clark's ch. m. Bonnie,	6	dr	

Time—2.45¾, 2.46, 2.45.

The race for fillies foaled since 1872 was a walk away for R. A. Stratton's chestnut horse Hull, and was won in three straight heats. Gail Hamilton took the second money. We append the

SUMMARY.

Same day—Purse, $75; for all colts or fillies foaled since 1872.

R. A. Stratton's ch. h. Hull,	1	1	1
A. J. Cooper's b. m. Gail Hamilton,	2	2	2
H. Mellon's b. m. Noontide,	3	4	4
E. M. Cooper's g. f. Kittie Cooper,	4	3	3

Time—2.51¼, 2.53, 2.53¾.

TO-DAY'S RACES.

The entries for Wednesday's and Thursday's races closed at the Reed House last night. The races will commence at two o'clock this afternoon. A full list of the entries is given below:

2.40 class—$100 to first, $60 to second, $40 to third.

John Shillinglaw, b. h. Henry Clews.
N. A. Gilbert, b. m. Hattie.
H. P. Wade, s. g. Prosper.
John Leonard, g. g. Lotus.
D. V. Stranahan, bl. g. Pete.

The running race did not fill. A special race has been provided—entries below.

Special race for horses that have never beaten three minutes, owners to drive—$40 to first, $30 to second, $20 to third, $10 to fourth.

R. W. Russell, b. m. Kitty.
J. C. Hart, g. h. Jim.
R. J. Saltsman, g. m. Sylph.
T. B. Wadsworth, Billy Blood.
T. M. Prendergast, b. s. Dorsey.
Charles Inguss, b. g. John the Baptist.

THURSDAY'S RACES.

The entries for Thursday's races will be found below:

2.35 class—$150 to first, $70 to second, $30 to third.

William Moore, c. g. Silver Cloud.
P. A. Gilbert, b. m. Hattie.
H. P. Wade, s. g. Prosper.
J. Hazell, b. m. Minnie Lee.

2.50 class—$75 to first, $50 to second, $25 to third.

James Clark, c. h. Bonnie.
D. V. Stranahan, bl. g. Pete.
J. Stafford, b. m. Pale Face.
J. Roderick, b. g. Hendricks.

WEDNESDAY—THIRD DAY.

OVER 15,000 IN ATTENDANCE.

The third day of the fair opened under the most favorable auspices. The day was pleasant though quite warm. At an early hour in the morning a few drops of rain fell, from masses of broken clouds, and for a while the indications were decidedly in favor of a showery time. However, the fragments appeared to contain but little moisture, and by 9 o'clock, nearly the whole mass had passed out of sight, hastened by a moderate west wind.

THE ATTENDANCE

Was much larger than on either of the previous days, and the display in every department was finer in consequence of considerable additions, and a more perfect arrangement by the exhibitors. Quite early in the morning country

PEOPLE BEGAN TO MOVE INTO THE CITY

By the various streets, and to make their way toward Twelfth street, and thence to the fair grounds, and during the forenoon several large trains arrived at the Union Depot, and soon the hacks, wagons, and carryalls, and the railway trains to the grounds, were busy transporting visitors thither. A heavy train came in from the west, containing a large number of coaches, all packed to their utmost capacity. Indeed, so completely crammed were they, that upon arriving at Springfield station, where a considerable body of people had gathered, the conductor informed them that he

COULD NOT POSSIBLY TAKE THEM,

But, we believe, sent a special train back to pick them up.

A train on the Philadelphia and Erie railroad, and one on the Lake Shore road, from the east, and another on the Erie and Pittsburg road, swelled the throng largely, and the hearts of the managers were made glad, of course.

Upon entering

THE GROUNDS

From the south-eastern entrance—the railway landing—the first thing that attracts the attention of the visitors is the building containing a large amount of machinery, puffing engines, buzzing planers and saws, &c., &c., and thitherward most persons start first. Near the corner of the grounds are a number of

REAPERS AND MOWERS,

In motion from power derived from the line shaft of the building, and where inventors, proprietors, or agents " stand and unfold " each the excellence of his invention. One party has a combined

REAPER, RAKER, AND BINDER,

Which draws a crowd constantly to witness the cleverness with which the machine gathers up the grain, carries it forward to the table, and there binds or ties it with wire, holding the straws as with "hooks of steel." Passing along, the next prominent object that greets the eye of the curious is the cider mill of Messrs. Boomer & Boschert, which, like "a city set on a hill, cannot be hid." It has been spoken of previously, and we need not go into details at this point.

Moving onward in a westerly direction, it becomes apparent that there are grouped together beneath the roof of

THE MACHINERY HALL BUILDING,

A long line of machines that are clattering, humming, and spinning as busy as bees in the accomplishment of various ends in mechanics, and the question naturally arises, whence comes the motor that gives motion to all these? It is a simple question, and one easily solved, as by slipping around to the south side, to the locomotive boilers and towering smoke stacks, it will be seen that the boilers and a row of engines all bear the imprint,

"BAY STATE IRON WORKS, ERIE."

And so it is; two fifteen-horse power "oil engines," manufactured by Messrs. Noble & Hall, proprietors of the above establishment, impart motion to the main shafting, which, in turn, becomes agents in the great plan of influencing or operating upon other bodies. This firm have on duty three of their

CELEBRATED "OIL ENGINES,"

That have for several years been extensively used all through the oil producing and oil-sinking districts. The first engine drives the east line of shafting, something over one hundred feet in length, and the second engine trundles the west end of the line, to which is attached a number of active and important machines.

These engines are expressly made for service and durability, and will compare favorably with any of the most celebrated of the fourteen or fifteen different kinds of "oil engines," so-called, in contra-distinction to other stationary machines. The principal motor differs somewhat from its fellows in the construction, in having a "rotary" instead of a "slide-balance" valve. Although it is rated at fifteen-horse power capacity, it performs nearly double that labor in running at the rate of speed required in its present position, two hundred and fifty revolutions per minute, with eighty pounds of steam, and makes no noise whatever, moving the machinery dependent upon it as easily and effectually as a boy would trundle a toy cart.

The other two engines, of the slide-balance valve, have a link motion attachment for reversing the motion, and may be operated with impunity at any rate of speed, (these engines being capable of running to three hundred or four hundred per minute,) that matter being effectually demonstrated yesterday, at various times, to the wonder of numerous bystanders. Indeed, these engines attracted crowds of visitors all day.

KING'S PATENT PORTABLE ENGINES.

At the east end of machinery hall can be seen two sizes of the above portable engine. That the inventor of this engine has achieved his great aim, viz: to produce an engine adapted to all the varied industries, one easily managed by persons who have not made the learning of "how to run an engine," a life study, is self-evident from the simple manner of its construction. The space occupied by the larger one on exhibition is only six by three and one half feet; that of the smaller one only twenty by forty-eight inches. The capacity of the first is twelve-horse, and that of the second, two-horse. The boilers are all tested at three hundred and fifty pounds, and warranted to purchasers. To such as want a cheap, portable, and at the same time a serviceable engine, the "King Patent Portable Engine" will be sure to fill the bill. Be sure and see them before leaving the fair grounds. They are manufactured at Corry, this county.

THE STOVE DEPARTMENT.

Brief allusion was made in yesterday's issue, to the superb display made by H. M. Reed & Co., of the St. James parlor heaters and ranges.

THE ST. JAMES

Is manufactured by the Sill Stove Company, of Rochester, New York. Ten parlor stoves of various sizes are exhibited. These stoves attract universal attention by the beauty of their design and their elegant finish. They have great heating capacity. The points of superiority are that the heat is steady and continuous. All kinds of baking is performed with the greatest of ease, and it is claimed that it is the most perfect combination of parlor-cooking yet invented. The stoves displayed are not especially made up for the fair, but are the same in style and finish as are sold every day, from the Mississippi river to Boston. The trouble heretofore experienced with slate, clinkers, &c., is entirely overcome by the peculiar construction of this stove. By a simple arrangement, the obstructions that form in the grates are dropped through into the ash-pit. The operator in charge tested the efficiency of the St. James as a parlor-cook in the most satisfactory manner, by roasting chickens and roast beef before crowds of admiring spectators. We heard the operator say, that if he could not, with perfect ease relieve the grate from cobble-stone the size of his fist, he would make any one of the spectators a present of a stove. The St. James Range is an elegantly-finished cook-stove, and is fast becoming a household favorite. In many important particulars, it is one of the most perfect ranges ever put upon the market. The edges of the stoves are of finely-polished iron, and add much to their attractiveness. Messrs. H. M. Reed & Co., Nos. 917 and 919 State street, have a large and complete assortment of these stoves at their large double store. Before buying a parlor heater or range, call and examine the "St. James."

THE CZAR PARLOR-COOK.

This stove, yesterday, attracted more than the usual attention paid to the other parlor-cooks, exhibited in stove hall, for its points of superiority over all others are many. The oven is larger than that of any other parlor-cook made, and is, at all times, heated and ready for use, and is not a deformity to the stove, it not being at the back, as in all others. The boiler holes are directly over the fire, and will boil as quick as any cook-stove, and quicker than any other parlor-cook. The main feature of this stove, is that the cooking arrangement is completely hidden, making a perfect parlor-stove, the beauty and heating capacity of which cannot be equaled. It combines all the latest improvements, and is *the stove* for the people. It can be found on sale at H. M. Reed & Co.'s store, in this city.

CROWN JEWEL.

W. W. Pierce & Co. make a specialty of a new stove, a base-burner—a perfect baker and cooker, as well as a powerful heater—known as the "Crown Jewel Oven Parlor." It is a handsome stove, highly finished, and is said, by good judges, after thoroughly examining into its construction and make-up, to possess the best arranged oven of any of the many parlor oven stoves now before the public. Parties should note this stove particularly, and examine it carefully to-day.

C. FLICKINGER & BROTHER

Make a fine display of stoves, both cooking and parlor. Their "Farmer's Friend" is a beauty, and not only ornaments a kitchen, but delights the housewife by the even tenor of its ways in heating, baking, &c. They exhibit the "Argand" Parlor, which "blows for itself," as well as a "Parlor Cook," a neat, compact, and cheap piece of furniture; also, a "Standard open fire grate," for hard or soft coal.

THE CORTLAND WAGONS.

In the wagon department the eye of the visitor is attracted by the two fine platform wagons exhibited by H. M. Reed & Co., of this city. They are beautiful, and well worthy of inspection. They are made from the very best materials, and finished in first-class style. One of the strongest claims of the wagon, and one which will have great weight with the public, are the solid bent corners, the body thus formed having no joints to break loose. The wagon box is, by their use, the most durable made. The Cortland wagons are manufactured at Cortland, New York. The company has made and sold three thousand platform spring wagons this year. At the New York State fair they carried off the three first premiums. They are the lightest and easiest running wagon, without impairing their strength and durability, in the market, and are fit to carry a family to church, to do marketing, and to carry light products, and will stand any kind of road. In the east they are the particular favorite of sewing machine agents, grocery men, and peddlers. Messrs. H. M. Reed & Co. are the exclusive agents for their sale in Erie city and county.

F. F. ADAMS & CO.

Make a remarkably fine display of articles manufactured by them in the line of "washers," "wringers," step and extension ladders, hat and coat racks, mop handles, spring beds, and other articles in wood. They also manufacture, and have on exhibition, wainscoting in walnut, ash, oak, chestnut, and cherry, put up in bundles ready for use.

This firm make a specialty of the "Complete" wringer, with folding bench, and are pushing its sale all over the country, as well as selling territorial rights, and feel assured of its being head and shoulders above all other machines now in use. Those that have not already examined this simple, and, as its name indicates, "Complete" device for wringing clothes, should see it at once.

In the eastern end of the same building, containing the above exhibit, is

A. B. GUNNISON'S PUMPS,

Which are manufactured from cucumber wood, and have justly acquired the reputation of being "the best pump in the world." House, cistern, and barn-yard pumps are on exhibit, and one of the latter, a large bore, is in operation, and capable of demonstrating what is claimed for it by the proprietor, that it will fill a pail by three strokes of the handle. Mr. Gunnison has on hand, and makes to order, porcelain, copper, or any other kind of cylinders.

HOME DEPARTMENT.

Mr. S. Sobel makes a really superb display of millinery, silks and satins, and fancy goods. His space is in the central division of the home department, facing the eastern entrance. His booth is richly decorated and filled with choice bonnets, rich silks and satins, ribbons, plumes, tips, feathers, hat ornaments, hosiery, fancy goods, lace handkerchiefs, lace bibs, infant's dresses, &c. In the center of the booth are two glass cases filled with millinery goods. In front of these cases, and on either side, are lovely hats, richly trimmed. They are sweet enough to make the ladies' eyes water as they look upon them. The French bridal hat is a splendid specimen of the milliner's art, and makes sentimental young ladies wish that they could be married in just such a hat. The fine ostrich plume, that sets it off so becomingly, is worth the price of several ordinary bonnets. Great taste was shown in arranging the exhibit, which is proved by the large crowds that constantly surround the booth. An infant's cloak, made of white silk merino, with white silk fringe, and trimmed with white silk star braid, is greatly admired. The cloak is valued at the modest sum of one hundred and seventy-five dollars.

ASTONISHING RESULTS FROM AN OPEN GRATE FIRE.

In the home department is exhibited one of Dimmick's Fireplace Heaters. It is a grate adapted for coal—either soft or hard—coke or wood. By its use upper rooms are readily heated, while the fire is below. Every particle of heat is realized by this grate, so that at least fifty per cent. of fuel is saved by its use. When there is such a desire as there is at present for open grates, it is well to look around for the best. The "Dimmick" seems to be *perfection* itself, having decided advantages over any other in the market. It is claimed that it gives double the heat of any other at one half of the expense. Be sure and see it.

WILLIAM F. WITTICH

Has, in the home department, a very fine collection of Erie county birds, and the finest group on the grounds, consisting of a snowy owl, in the act of killing a pheasant. He makes a specialty in mounting birds for ladies' hats. His place of business is at the corner of Seventeenth and Holland streets.

WILLIAM B. GRAHAM.

Mr. William B. Graham exhibits, on the north side of the home department, a case filled with about forty varieties of choice writing papetries. It is displayed in highly ornamented boxes. A large and handsome one is arranged in the shape of a work-box, and contains, besides the envelopes and paper, a thimble, thread, shears, paper-cutter, &c. Mr. Graham keeps a fine assortment of these papetries, at his store, in the opera-house.

SPICES.

Mr. P. F. Miles has on exhibition, in the home department, specimens of spices—both whole and ground—which he keeps for sale, at his mills and store, on Seventh street. The variety is large, and represents every article known to the trade. Mr. Miles has worked up a large trade in our city, which he deserves, on account of his dealing strictly in pure goods. A call at his establishment, on West Seventh, between State and Peach streets, will convince you that he carries a large stock, always fresh.

EXCELSIOR SLEEPING COACH.

The Erie Chair Company present for the consideration of the public a novelty in the way of a baby's wagon or carriage, which is unlike any other in use. It is a beauty as to workmanship. It is so constructed that it can be converted from a sleeping coach, with a parasol or sun-shade covering, into an upright, open or covered seat carriage. This firm also exhibit their far-famed baby rocking chair.

HENRY BAKER

Has a fine exhibit of boots and shoes, embracing all of the various varieties made, from an infant's wear to men's and ladies' goods, in addition to his big signs. His show is most excellent, and attracts much attention from the passers by. Store, 501 State street.

IN THE AGRICULTURAL DEPARTMENT,

In the north-east corner of the building, will be found a full and exceedingly satisfactory display of the agricultural products of southern Iowa and south-eastern Nebraska, cereals, etc., in different forms, corn in the ear, etc. The display is fine, and the agent's cabinet of vegetable curiosities is well filled; besides he has a tongue that knows how to tell whence the specimens came. Parties intending to visit the great West, should call and see this interesting niche, and get a catalogue.

AMONG THE HAY RAKES

We noticed that "Yankee" Haskell, with his sulky rake, the old revolver hitched to wheels. And we confess it is astonishing to see him operate it with a horse on a full run. He has two on the ground, one a two-horse rake, with pointed head. He informed our reporter that there are over six hundred in use in this county, and all giving good satisfaction.

THE DINING HALL

Was crammed—a multitude thronging upon the ladies at dinner time, and came in rather faster than they could be served by the force in attendance. A report went out to the effect that the edibles were exhausted, but we are assured by the managers that such was not the case. No such case was apparent. The ladies were short-handed for such a company, and could not wash the dishes, or prepare the food quite fast enough. The trouble, we are assured, will be remedied to-day.

The Stock Exhibit

Took place at about half-past eleven o'clock. The procession was headed by Knoll's band, and under the direction of General H. L. Brown, marshal, and Messrs. Kennedy King and George C. Dunn, assistants. Some forty stallions were in line, and a number of geldings, and the trotting stock. Next came a very respectable show of cattle, bulls, cows, and oxen, in which home stock figured quite largely. The sun shone out quite warm about that time, and the heavy animals blowed some in walking around the track. The show was very fair, and was witnessed by a large number of people.

THE RACES.

The races, yesterday, were exciting, and attracted large crowds. The grand stand was well filled, and the enclosure, near the judges' stand, and along the entire course, was filled with vehicles of all descriptions.

The 2.40 race was the first on the lists. For this race, there were five entries and five starters. The first heat was won by the gray gelding, Lotus.

The second was taken by the black gelding, Pete. Honorable C. M. Reed's bay horse, Henry Clews, captured the third heat, which was hotly contested, Pete trotting well, and coming only half a length behind Clews.

In the fourth heat, Lotus had a good start. At the first turn, Clews was pocketed, and forced to take the outside. The bay trotted well, and on the home-stretch came up nobly, and passed under the wire a head or so behind Lotus.

In the fifth heat, the horses got a good start, Clews and Lotus having the lead. At the first quarter, the gray and bay were side by side. At the second quarter, Clews drew ahead, the gray losing its feet, and falling to the rear. Clews was then an easy winner.

The sixth heat was the final and decisive one. Clews shot ahead, but broke on the first quarter, allowing Pete to take the lead. The bay soon got to work, and both came down the half mile flying, Pete being half a wheel ahead. On the third quarter, Clews, by splendid trotting, cut off Pete, winning the heat and race. Lotus won second money, and Pete third. We append the

Summary.

Erie, Pennsylvania, September 26.—Purse $200—2.40 class.

C. M. Reed's b. h. Henry Clews, ...	4	4	1	2	1	1
John Leonard's g. g. Lotus, ...	1	2	2	1	3	2
D. V. Stranahan's bl. g. Pete, ...	2	1	3	3	2	3
N. A. Gilbert's b. m. Hattie, ...	3	3	4	4	dr	
H. P. Wade's s. g. Prosper, ...	5	5	dr			

Time—2.41¼, 2.40¼, 2.43, 2.41½, 2.43¼, 2.44.

THE THREE MINUTE RACE.

For this race, there were six entries, and but four starters. Mr. J. C. Hart's gray horse, Jim, won the first heat very handily. The succeeding three heats were taken by the Westfield horse, Dorsey, owned by Mr. Thomas M. Prendergast. Below is the

SUMMARY.

ERIE, Pennsylvania, September 26.—Purse, $100—3.30 class.

T. M. Prendergast's b. s. Dorsey,	4	1	1	1
J. C. Hart's g. h. Jim,	1	4	4	4
T. B. Wadsworth's b. m. Billy Blood,	2	2	2	3
R. W. Russell's b. m. Kitty,	3	3	3	2

Time—3.30, 3.01¼, 3.14, 3.16½.

TO-DAY'S RACES.

The entries for the races to-day were published in the *Dispatch* of yesday. The trotting promises to be fine, and will, no doubt, bring out a large crowd.

In addition to the two races, to be trotted this afternoon, the running race, which has been filled, will be called at one o'clock. The following entries have been made:

G. English, b. l. Troubadour.
R. A. Dempsey, b. f. Florence.
J. R. Raymond, b. h. Bay Jim.
James Oliver, b. g. Harry.

THURSDAY—FOURTH DAY.

THE ATTENDANCE INCREASING—GREAT SUCCESS.

The fourth day of the Pennsylvania State fair was a success in every particular. The dreaded "equinoctial" did not make its appearance, nor even threaten his coming. Early in the day a breeze from the south rendered the atmosphere excessively warm for the 27th of September, and had the wind not shifted to the north about 10 o'clock, the rays of the sun, which came down almost uninterruptedly, would have been oppressive indeed. As it was, the hot dusty air was tempered somewhat, and when the city street sprinklers made their appearance, as they did about 11 o'clock, a considerable change for the better followed soon after.

The number in attendance was much larger than that on Wednesday, and the buildings were constantly crowded, and almost every nook and corner in the grounds were dotted over with people moving to and fro, as if their time was limited and it became necessary to see what was worth seeing in as short a time as possible. As was the case on Wednesday, a large delegation came in from the Western Reserve, but still larger than the previous day; Chautauqua county was liberally represented; the counties of Crawford and Warren did exceedingly well, and the natives of Erie county and city came up by thousands. Many of the manufacturing establishments in the city shut down to give their employés an opportunity to go the fair, and the public schools closed their doors, and, as a consequence, Superintendent Jones and his army of teachers and assistants, together with the scholars and pupils, under the charge of each, came out in a body, or nearly so, and, of course, produced a very perceptible ripple in that surging, restless tide of humanity. East and West Millcreek, and the adjoining and neighboring townships, villages, and boroughs, came in with teams, and for several hours Twelfth street, the main thoroughfare leading to the grounds on the east, was thronged with vehicles of every sort throughout the day, and the two trains of cars that made regular trips every ten or fifteen minutes, each having five coaches, did a heavy business, particularly in the morning and evening, and it is believed that there were never more teams upon the grounds at any one time. The chief of police for the grounds, Dan Mitchell, and his efficient patrolmen, were active in preserving order, and, as far as we know, no disturbance or unpleasantness of any kind occurred. The chief marshal, General H. L. Brown, and Messrs. Kennedy King and John S. Dunn, (not G. C. Dunn, as announced in yesterday morning's *Dispatch*,) assistant marshals, were also vigilant in carrying out the wishes of the officers of the Society. Superintendent Allen exercised a fatherly care over matters pertaining to stock, and was flying about in various directions, now here, then there, looking after the common interests of the exhibition. And, in this connection, we may say that the President of the Society, Hon. John W. Hammond, the Recording Secretary, Mr. D. W. Seiler, and Corresponding Secretary, Mr. Elbridge McConkey, have each and all been untiring in efforts to accommodate the exhibitors, and to see that the interests of the Society and the public are enhanced.

Machinery hall, the home department, vegetable and floral halls, in fact all the departments were packed all day, and very many had not the hardihood to attempt to force their way through, considering the heated state of the atmosphere.

Below we give some further facts in regard to articles on exhibition. Mr. Earle W. Gray, proprietor of

ERIE CITY CARRIAGE WORKS,

Has on exhibition, in the department set apart for vehicles, a number of fine wagons, &c., among which are a four-bowed phæton, and a two-bowed phæton, a Brewster top wagon, a no-top Brewster, and a double-side spring open wagon. These are all manufactured from the very best seasoned second growth hickory, and are as solid as such timber, (almost like iron,) steel, and iron can make them, and for excellence in finish, no carriage establishment in the country is ahead of the "Erie." The side-spring wagon is a great favorite in the oil regions, and large numbers find their way thither. The construction of these wagons peculiarly fits them for use on rough roads, being, as they are, light, strong, and easy. In fact, all the vehicles made at this establishment will compare favorably with those of any other makes, no matter how celebrated.

Mr. Gray has also on exhibition, in machinery hall, a set of the famous taper-sleeve pulleys, that have become so popular for the past two years, which figured so conspicuously on the shafting in the Centennial Exhibition, as well as on the shafting of the present State fair. These pulleys are light, strong, easily adjusted to any sized shaft, and with couplings, are firmly secured in position without keys, set-screws, bolts, or pins, by the taper-sleeve arrangement, which, it is claimed, is the only absolutely true fastening in use, as a pulley properly balanced cannot be thrown out of balance if secured with this fastening, which cannot be said where key or set-screw is employed. The fastening of the pulley is of iron, so constructed that a pulley may be taken from a large sized shaft, and placed upon a much smaller one, by removing the iron center, which may be done by any one in a few moments' time, simply by substitution of another sized center, the hole in all the pulleys being made the same size, so as to fit the exterior surface of the center. A half pulley is also shown, which can be placed upon a shaft at any desirable point without the removal of intervening pulleys, loosening up the shaft, &c. In

THE LINE OF WOODEN PUMPS,

Mr. L. W. Olds presents several varieties, all of which are of the very best timber and very highly finished. For deep wells, he has a device by which he can operate with the same facility at fifty feet, with a patent drop-valve sucker rod, &c., as at ten feet, all being easily adjusted and arranged to be removed through the top of the pump in case of obstructions, without taking out the pump. Mr. Olds has a drive pipe for wooden pumps, and has many new and valuable improvements, and having been in the business for thirty-three years, ought to be able by this time to understand what a pump should be. He has also taken premiums at seven or eight different State fairs. Visitors will do well to examine his stock.

IN BOOTS AND SHOES,

Mr. Henry Baker has one of the neatest displays of boots and shoes, in a handsome case in the home department. To show the extent and variety of his stock, we may say that in the line of men's shoes, he has twenty different kinds, ten kinds in ladies fine wear, and a great many varieties in men's boots and children's and baby's shoes, and keeps none but the best makes. He has two elegant models of a boot and shoe, which attracted yesterday, as indeed at all times, the attention of the passers-by. Store 501 State street.

WATER ENGINE.

One of the most attractive exhibits in machinery hall is the water engine, manufactured by Mr. John Coates, of this city. It is two-horse power, and occupies a space of about three by six feet. This engine is adapted especially for places where room is scarce. It is neatly made, and the reputation that Mr. Coates has made for himself in the manufacture of engines, warrants us in recommending it.

COOLEY'S CREAMERY.

Mr. Dorsey, the exhibitor of the creamery at the fair, made an experiment with sixteen quarts of milk, furnished by D. D. Tracy's stock of Alderney cows. The result was twenty-five per cent. of cream in two hours.

THE CHAMPION MOWING MACHINES.

Among the many mowing machines on exhibition, there is none that creates the attention of the Champion. The Messrs. Zuck & Pfeffer, agents, are on the ground, with assistants, who take great pains in putting forth the merits of their mower. The entire frame of the Champion is of wrought iron, the whole machine finely finished, and when at work, runs as evenly as clock work. Among the machines represented, is what they term the "New Champion," differing from the others in the manner of working the cutting-bar, the whole operation being done by two cog-wheels, in the most simple manner possible. The Champions are used as combined reapers and mowers, single reapers and single mowers, and the combined machines may be used as self-rakers, as droppers, or as mowers, and are complete and perfect in every place. It is claimed that the Champion has a great advantage over any other machine, in their ability to cut and save the crops, however badly they may be tangled and laid on the ground. No farmer should miss seeing these machines while at the fair. We have no doubt but that the "New Champion" will take the lead of any machine for the same purpose yet invented. The Champion machine can be found at the northeast end of the grounds. They are manufactured at Springfield, Ohio, and at Chicago, Illinois, by Messrs. Warder, Mitchell & Co.

WATER COLOR PAINTING.

In the home department, Miss Austa Densmore exhibits a very fine collection of water-color paintings. Among the display we noticed a very pretty group, consisting of Roses, Tulips, Lady Washington, &c. One picture is of some Water Lilies, which was painted from lillies from Edinboro' lake.

MR. GEORGE SENYARD, ARTIST.

Near the eastern end of the home department is to be seen one of the best collections of original paintings in oil. The citizens of Erie will readily recognize a fine portrait of Judge Vincent, and one of the late John H. Walker, both in oil. Near by is a head of Christ, an original study, which attracted much attention. "Christ in the Temple" was painted from memory, of a picture in the National Gallery of England, where Mr. Senyard studied for several years. Indeed his collection has a decided English tendency, as illustrated by the "Group of English Game," "Not Caught Yet," after Landseer, "A Wild Wood Scene," from St. John's Woods, all painted in the rich and lively colors of the English school. The delicate tints and outlines of fruit and glassware have been admirably imitated in a beautiful little fruit piece. There are other fine landscapes and studies, but the branch of the art to which Mr. Senyard pays special attention is portrait painting, several specimens of which have already been mentioned. His studio is at Girard, Pennsylvania.

SHOTWELL'S CAR REPLACER.

To-day at 1 o'clock, Shotwell's car replacer is to be tested on the railroad track at the fair grounds, under the supervision of the officers of the Society, and all railroad men will be present, if interested. The invention is an ingeniously contrived machine for replacing cars on the track, which in simplicity and manipulation surpasses anything of the kind yet invented, and is designed to come into popular use on all the leading railroads. One of its greatest advantages is, that it can be placed on all engines and be conveyed along as part of the necessary equipments without the least inconvenience. It is manufactured by the Pennsylvania Steel Company, and offered by that company to the railroads of the country with the greatest confidence.

TRAINED OXEN.

Fred Olds, of Waterford, has on exhibition a yoke of three-year old steers, that exceed in training anything yet coming under our observation. They are well matched, and of a pure white color. By a word from Fred, or a motion of the whip, they can be driven double without a yoke, and by simply calling each by name, they will separately change places, take a long circle around their master, and come together again as they were, or reversed, just as bidden by their master. Fred will step off about a rod and kneel upon one knee, when Dick will come and lie down by him, then Charley will come walking up and lie quietly down beside his mate. This performance drew a large and interested crowd, and was repeated several times, without variation.

The Plow Trial.

At 10 o'clock, A. M., was the hour set for the plow trial, and although the several exhibitors of plows were notified on Tuesday morning, but one make, with the "Oliver Chilled," of South Bend, appeared to contest for the Society's medal for "best general purpose plow."

The work of this plow was freely praised by the large concourse of farmers present, many of whom remarked that the reason for its being allowed to carry off the prize, without having a single oompetitor, was plain to be seen.

The display of plows made by this company was the center of an admiring throng during the week. One plow, with rosewood beam and handles and gold mountings, with its working surfaces polished like a mirror, is certainly the finest piece of work in its line ever seen on the grounds. H. M. Reed & Co. are the agents in this city.

THE RACES.

There is nothing under the sun that will attract the crowds at fairs so well as "purely agricultural hoss trots." This was clearly demonstrated yesterday by the thousands who gathered to witness the races. At the least, one thousand five hundred people filled the grand stand. The enclosure inside the course was filled with several hundred vehicles of all descriptions, and sandwiched between and literally hiding the fence, were several thousand people. The balconies of the club house were packed full, and all around the course, leaning against the outside fences, were flocks of men, women, and children. The sight from the judges' stand was a glorious one. Never before in the history of the association has such a vast throng assembled to witness the races. The glorious weather no doubt contributed largely to the success of the day.

The running race was won by J. R. Raymond's bay gelding, Bay Jim, who took the second and third heats.

The 2.30 race was won without much trouble by the Fredonia horse Silver Cloud, who took the first, second, and fourth heats, becoming an easy winner. In the third heat Silver Cloud lost his feet, and was cut out by Minnie Lee, who shot under the wire half a length ahead.

The 2.50 race was without interest, J. Stafford's bay mare Paleface winning easily in three straight heats. Below will be found the records of yesterday's races:

SUMMARIES.

ERIE, PA., *September 27.*—Purse $50; running, one half mile, best two in three.

J. R. Raymond's b. g. Bay Jim,	2	1	1
R. A. Dempsey's b. f. Florence,	1	2	2
A. G. English's b. g. Trobadour,	3	3	3

Time, 56¼ seconds, 56½, 55½.

Same day—Purse $250; 2.35 class.

Wm. Moore's c. g. Silver Cloud,	1	1	2	1
J. Hazell's b. m Minnie Lee,	4	4	1	4
Wallace Pierce's b. g. Phil Sheridan,	2	2	3	3
P. A. Gilbert's b. m. Hattie,	3	3	4	2
H. P. Wade's s. g. Prosper,	dr			

Time, 2.42, 2.38¾, 2.38, 2.37.

Same day—Purse $150; 2.50 class.

J. Stafford's b. m. Paleface,	1	1	1
J. Roderick's b. g. Hendricks,	2	2	3
James Clark's c. h. Bonniele,	3	3	2
J. V. Stranahan's bl g. Pete,	dr		

Time, 2.59½, 3.00, 2.55.

A RACE FOR THE LADIES.

Mr. Amos E. Kapp, at one time President of the Pennsylvania State Agricultural Society, and who has been officially connected with the Society since its organization, in 1852, and who, for several years past, has been chairman of the Committee on Trotting, has arranged, for the benefit of his lady friends, a running race for a special purse which he offers. It will come off at 2 o'clock this afternoon. The drivers will be dressed in costume, and a heap of fun is promised. The entries will be found below.

Running race—Half mile, best two in three, for a special purse offered by Mr. Amos E. Kapp.

J. R. Raymond, b. g. Bay Jim.
R. A. Dempsey, b. f. Florence.
A. G. English, b. g. Trobadour.
James. Oliver, br. g. Harry.

THE LAST DAY.

The fair closes to-day. All those who have not yet seen the big exhibition should be sure to go, as it will be their last opportunity. Admission for to-day twenty-five cents. The programme for to-day includes a grand cavalcade of stock around the race course, a running race, and a double team race. Particulars of the running race are given above. Hon. C. M. Reed's finely matched team will trot in the double team race. This is the last day, and the price of admission is twenty-five cents—and don't you forget it.

REDUCTION IN PRICE.

In order to give mechanics and the laboring classes an opportunity to attend the fair to-day, the officers have reduced the price of admission from fifty to twenty-five cents. This will give all an opportunity to attend. We hope to see the grounds as lively with people as yesterday.

The managers of the State fair, the exhibitors, and visitors, were yesterday again rejoiced for continued charming weather, and that the exhibition closed as it opened, and continued throughout the five days of its existence, without rain. To be sure there was, as there has been each day, a smart springling of caloric and dust, but all agreed that dust and perspiration were easier to overcome and brush off than cold rains and clinging mud. The morning was cool and delightful, and when visitors arrived upon the grounds and found a " plentiful lack " of auditors, they improved the opportunity thus offered of going through the various halls and taking a satisfactory inspection of the novelties and attractions in each, which, by the way, could not be done throughout the day (Thursday) because of the crowded passage-ways. Toward noon there was a moderate attendance, but the fact became patent to every one that no department or candidate for public favor was going to be overrun with business.

The ladies at the Home dining hall were abundantly supplied with most excellent edibles, and had an abundance of time to serve all that patronized them, while the number was by no means few, and we are pleased to note, that a handsome sum for the Home for the Friendless has been realized by the contributions of our citizens, the disinterested and continuous exertions of the lady managers and others, detailed from day to day to attend to the arduous duty. The public has been well served, and a great benevolent enterprise furnished with the aid it so much stood in need of.

During the forenoon there was a considerable moving of stock about the grounds getting ready to leave as well as to show premium cards that were attached to the heads of the horses, cattle, sheep, swine, &c., but no formal cavalcade took place, for the reason that parties living at a distance were more concerned in getting home than to satisfy a curious public.

THE RACES

Were not so largely attended. The event of the afternoon was the running race for a purse of $40, offered by Mr. Amos E. Kapp. It was gotten up for the benefit of the ladies, and a large turn-out of the fair sex watched the race with interest. It was won easily by J. R. Raymond's bay gelding Bay Jim. Otis Huflin, of Corry, a bright, sharp lad, rode Jim to victory. He was nobbily rigged out in the national costume—red, white, and blue—and by his skillful riding won considerable applause. At the conclusion of the race, Mr. R. W. Russell, on behalf of the ladies, presented Mr. Kapp with a handsome bouquet. Mr. Kapp acknowledged the compliment by a happy extempore speech. The following is the summary of the running race:

SUMMARY.

ERIE, Pa., *September 28.*—Running race for a special purse of $40, offered by Amos E. Kapp.

J. R. Raymond's b. g. Bay Jim,	1	2	1
R. A. Dempsey's b. f. Florence,	2	1	2
A. G. English's b. f. Trobadour,	3	3	3

Time, 57 seconds, 57¼, 56¾.

The double team race was the fastest ever trotted over the Erie course. The entries were Hon. C. M. Reed's finely matched team of bays, Henry Clews and Northern Spy, and a well-matched pair of horses owned by Sampson Short, of North East. Only one heat was trotted. This was easily won by the Erie bays, by the remarkably fast time of 2.40. It was by all odds the pretties double team race ever seen in this section. As only one heat was trotted, it is unnecessary to give the summary

ENTOMOLOGY.

THE EXTERMINATION OF THE CURCULIO POSSIBLE.

So much has been said and written about the "curculio"—that arch-enemy of the different varieties of stone fruit—that anything more, unless it evolved some reliable remedy against its further depredations, would almost seem superfluous. It appears, however, that several members of the "St. Joseph Fruit-Grower's Association," (Missouri,) have been experimenting on the destruction of the curculio with a success that must be encouraging to others, since they admonish their brother fruit-growers not to lose "a single day, for with united action 500,000 curculios may be killed in a single day." The *American Entomologist*, for June, 1870, contains a five column article on the subject, and although it may be too late in the season to make an effective trial the present year, yet if the remedy is of half the value claimed for it, it will do no harm, and *may* do some good, to make a record of it at the present time, especially since the foe is such a formidable one, and the injuries which fruits sustain from it are so great and so aggravating. We shall not attempt to give a detail of the article on this occasion, and, therefore, our readers must be satisfied by a mere abstract of the leading points connected with the subject. It appears that Messrs. Ransom, Whittlesey, and Bonelle had, in five hours, destroyed upwards of 5,000 of these insect depredators in a portion of three small orchards; and the argument is, that others may do likewise, provided they used the same means, possess the same intelligence, and war with the same perseverance, until the much-desired end is accomplished. The process seems to be merely a clearing away of all the grass, weeds, and whatever else may be under the trees, to make the earth smooth and clean under the trees as far as the branches extend; and to set traps, in the form of small pieces of board, stone, chips, or anything else that may serve as a shelter for these noxious insects. The theory is, that the curculios collect under these traps at night or during the day, especially if the weather be a little cool, and are thus easily captured and destroyed, for the curculios only come forth and fly to the trees to sting the fruit when the sun is very warm.

Now, it so happens that our own early experience is somewhat in harmony with this idea, so far as it goes, although it was only incidental, and without thinking of the subject, in relation to its ultimate utility as a remedy. The first specimens of the curculio we ever saw we obtained from under a large flat stone, in an orchard, on a sunny hill-side, about the middle of the month of March, 1842. The weather was unusually warm for the season, and insects of different species became active very early. We have also found them under shelter, at other times and places, and on one occasion, as late as November. These facts evince that the curculio is a hybernating insect, and that it may be found sheltered under a proper cover, both early and late in the season. This does not militate against the fact that the last brood of the season—if such *is* a fact—may remain in the ground in its *pupa* state, or may go into the ground in its *perfect* state, and be invited forth at any time, when there is a sufficient vitalizing heat to reanimate it.

Now, in view of these circumstances, it seems to us very clear that a successful warfare might be waged against the curculio, with the proper determination, patience, and perseverance to back it up.

Firstly, from an early period in the spring, we would suggest the proper preparation of the surface under the trees, and the laying down of traps, with their frequent examinations.

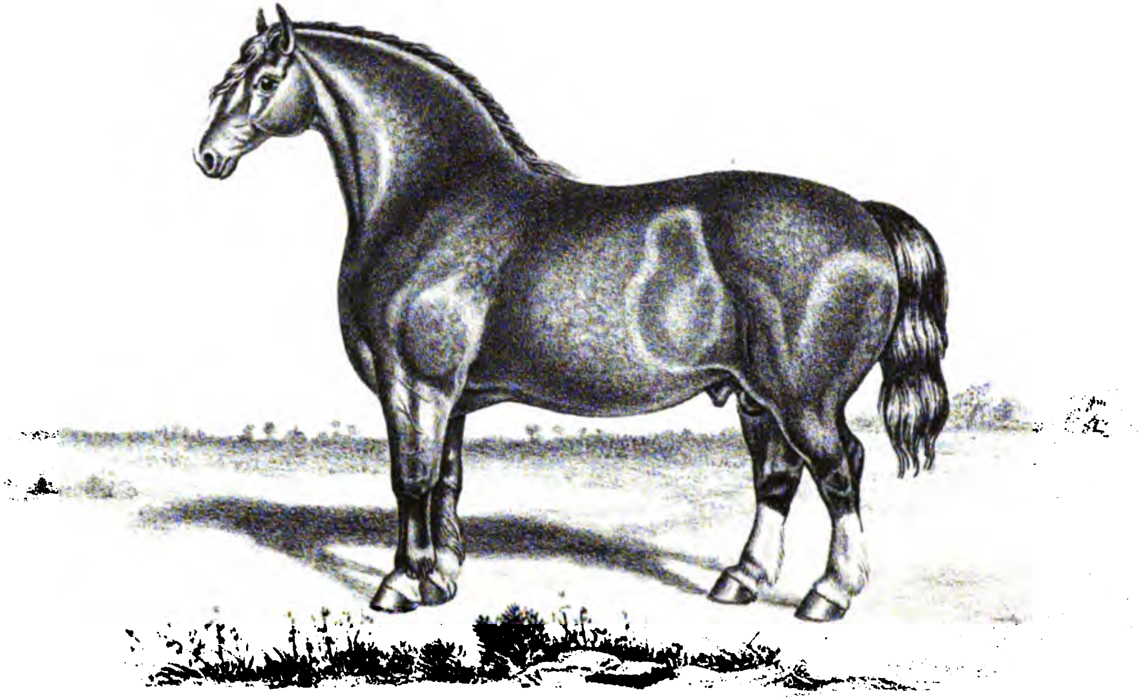
Secondly, the jarring of the trees, from the time they are in bloom, and the continuance of it, as long as any curculios are dislodged.

Thirdly, the gathering of all the fallen fruit, two or three times a day—at least not less than once a day—so long as any fruit continues to fall. Of course, we need not instruct our readers what to do with the insects after they are captured, or with the fruit after it is gathered, for their object in securing these is for the purpose of destroying them. Perhaps their immersion in boiling water would accomplish this end as effectually as by any other means. If fruit growers deem these measures too laborious, why then, of course, we must be content to tolerate this pest of the fruit crop, until some happy combination in the economy of nature shall supervene, and the curculio die out, or disappear without the intervention of human aids or remedies R.

THE GRAPE CODLING.

PENTHINA VITIVORANA.—*Paek.*

As early as the summer of 1855, we have heard, from a few districts in this county, that dark-colored worms were detected in the grapes similar to those found in the apple, the cherry, and the plum; but, somehow, we never, until within the last year or so, succeeded in getting the worm itself.



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LINCOLNSHIRE STALLION

UNIV. OF MICH.

Last year we had specimens sent us from New Jersey, and other localities, in this State, but, from a want of the proper conditions, we did not succeed in breeding the perfect insect. However, from the observations which we were able to make, we allied the insect to the "apple codling," and, therefore, prematurely, proposed for it the name of *Carpocapsa vitisella*, but have been anticipated by Dr. Packard, of Salem, Mass., who succeeded in breeding the moth, and who named it *Penthina vitivorana*, which we have accordingly adopted. This worm is a small caterpillar, similar in form to that usually found in the apple, only of a darker color, and has a yellowish head. It feeds on the pulp of the grape, and, therefore, when the grape is black, and the insect appropriates the substance containing the coloring matter, it will be darker than when the grape is white, red, or green. It passes from one grape to another through a small hole, which it makes, and, therefore, those grapes infested, in a cluster, will generally be found adhering more or less together. They will be found in the grapes in August and September, but I have had them sent to me in the month of October. After this worm is matured, it leaves the grape, and makes a semicircular cut in the leaf, which it rolls up, forming a sort of shelter beneath it, and is changed into a *pupa*, from which a little moth in time issues forth. The larva, or worm, is scarcely three eighths of an inch in length, and has sixteen legs. The body of the moth is about the same length, and the wings expand about five eighths of an inch from tip to tip. The wings are rather narrow, and the front pair are a pale slate-blue in color, somewhat variegated. The hind pair are a slate-brown, and are only about two thirds the length of the front pair. So far as I know, it is not yet ascertained in what form this insect survives the season, but it is presumed it is in the pupa form. Those I had under my observation changed to a small dark-brown *pupa*, and were kept in a room all winter, in which the heat frequently alternated between the freezing point and 80°, but in the spring they were found "dried out," and dead. Dr. Packard, I believe, succeeded in bringing his insects out some time during the fall or winter. Nor is it known at what period the eggs are laid, but probably in the month of July. This insect must not be confounded with the grape *curculio*, so ably ventilated by the late Dr. Walch, of Rock Island, Ill., nor with the little *ichneumon fly*, described by Mr. Saunders, of Canada. When we are better acquainted with its whole history than we are now, we may be better able to suggest a remedy. In some of the Western States, and especially in the valley of the Mississippi, it has been more destructive to the grapes than in any locality we have yet heard of in the Middle or Eastern States. We admonish our grape growers to "look to it."

R.

THE GRAPE-SEED INSECT.

ISOMA VITIS.—*Saund.*

Inasmuch as we have been informed that, in various instances, enlargements of the seeds of the grape have been observed in this county, we have thought they might possibly have been produced by the "grape-seed insect," described by Mr. William Saunders, of Canada, in the columns of the *Canadian Entomologist*, and, therefore, some notice of it in advance might not be out of place. This insect belongs to a different *order*, and, therefore, differs very materially from the "Grape Codling," and the "Grape Curculio," alluded to in our January and February numbers of the present year. This is a hymenopterous insect, and is allied somewhat to the "Gale-flies"—the same order to which the bees, wasps, hornets, and saw-flies belong. Mr. Saunders describes the *larva* as a milk-white, semi-transparent, footless grub, about one twelfth of an inch in length, and the greatest width about one third of the length; head small and whitish; mandibles hooked, sharp-pointed, and of a dark-brown color; body distinctly annulated; whole surface shining, widest along the middle segments, and tapering toward the ends. This *larva* is very sluggish in its habits, and will remain for a long time entirely motionless, unless disturbed.

The fly has four clear, iridescent wings, and expands about one sixth of an inch. The head is large, and flattened in front; the whole insect is black, head and thorax deeply punctured, and covered with whitish hairs; the abdomen is shining, long and smooth, and united to the thorax by a short pedicle. The anterior pair of feet are a pale brown, and the second and third pairs nearly black, and all the *tarsi* pale brown. The *antennæ* are black, and thickly covered with whitish hairs. Mr. S. obtained the grapes infested with these *larvæ* in August, in Canada, but the mature flies did not evolve until the middle of July, in the following year, the grapes having been enclosed in a bottle; but doubtless in a perfectly normal condition, and, especially in a more southern latitude, they would be some weeks earlier in their development. Of course, when the *seeds* of fruit are infested, the effect upon the pulp must be of a damaging character, but if the *larva* or *pupa* remains in the seeds all winter, there is little prospect of their being propagated very rapidly, (unless the females are *very* prolific,) seeing that so many of the seeds are variously destroyed.

R.

THE CURRANT WORM.

The miller that deposits the egg is about the size of the common bee-miller, with broader wings, and of a dark brown color. They deposit their eggs about the 10th to the 15th of June, on the under side of the leaves, generally on the new suckers, and close to the ground. The eggs are white, and glued to the stem and branch stems of the leaf in a row, the ends nearly touching—there being sometimes nearly one hundred on a single leaf. They hatch in three or four days, the young worm crawling from the stem to the thin part of the leaf, where it at once begins its work of devastation, being invariably blessed with a ravenous appetite. The first indications of their presence will be seen in the leaf in which they were hatched being pierced with holes, about the size of a pin-head, each worm making a separate hole. They continue to gnaw round and round until the several holes meet, and the leaf is entirely consumed, when they all emigrate in a body to the leaf above, which soon disappears; and so on, leaving nothing but the withered stems behind them. After following up to the top of the sprout they started on, they then separate, and go off to the different branches of the bush. They live about twenty-five or thirty days on the bush, when they fall to the ground, change to the chrysalis form, work themselves into the ground, and there remain until the first of next June, when they reappear in the form of a perfect miller, to repeat the operation of the year before.

My method of fighting these plagues is as follows: Keep close watch of the bushes after they are fully leaved out, examining very closely the lower leaves on the new shoots, and as soon as you see one that is perforated with small holes, pick it, and drop it into an old pail, and so go over all the bushes carefully every other day, as long as the worms continue to hatch, which will be about two or three weeks, and burning the leaves plucked. Be sure and pick, each time going over the bush, every leaf gnawed by the worms. I have about seventy-five as fine bushes as you often see, while most of the currant bushes in this vicinity are entirely destroyed. I have had to be vigilant and persevering; but I have conquered so far, which is some satisfaction, and have all the nice currants I want to use.—*M. Wardner, in Plattsburg Republican.*

The above remedy, or rather "method," of fighting insect enemies, is the very one we have successfully pursued in exterminating the nauseous "squash bug," (*Coreus tristis*)—the little black, and red-collared "grape moth," (*Procris Americana*)—the "steel-blue grape flea-beetle," (*Haltica chalybea*)—the "rose slug," (*Selandria rosea*)—the "American currant moth," (*Ellopia ribearia*)—the larvæ of the currant saw-fly," (*Salandria *ribis*)—the "American tent-caterpillar," (*Clisiocampa Americana*)—the "canker-worm," (*Anisopteryx veruata*)—and other gregarious insect larvæ, which infest and feed upon the leaves of plants, shrubs, and trees. And although there are other remedies for the destruction or defeat of these insects, yet we doubt whether anything has yet been discovered that is more *certain* in its results, so far as it goes, or so far as it can be applied as *hand-picking*. A thorough daily examination for two or three weeks, in the month of June, will ultimately exterminate most of the above-named insects in any district where the war against them is made general. And as they are all, except the first-named species, and that one seldom making any other movement than turning to the opposite side of a leaf or stem, very sluggish in their habits, in the larva state, there is no difficulty at all in effecting their removal, or in gaining access to them. But the plants, shrubbery, and trees, which they infest, should be closely and minutely examined, at least every morning and evening. If they are not on the upper sides of the leaves, look for them on the under sides. Some of them retire to the under sides at midday, when the sun is hot, and some confine their operations to the under sides altogether; but, wherever they are, their effects will be visible, in deformity and defoliation. Birds, and insect parasites, and carnivores will also assist in their destruction, but the safest plan is not to depend upon these, but to go to work earnestly ourselves, in a manual operation, if we wish to achieve success. Fruit and vegetables are too valuable to submit to mere chance for their preservation, and every well directed effort to effect an end so desirable will eventually bring its reward.

The currant worm alluded to at the beginning of these remarks (*Selandisa ribis*) is not very numerous yet in this locality, but we have found it both on the currant and the grape. These worms are also of a green or yellowish-green color, with black spots, and about three quarters of an inch in length. The fly is clear winged, and is a hymenopterous insect. To "fight" an insect successfully, we ought to know what it is; particularly if we desire to communicate to others our success, and the mode of attaining it. In addition to these enemies of the currant, we have several "borers," the larvæ penetrating the canes, and undergoing their transformations therein. There is the "imported currant-borer," (*Trochilium tipuliforme*,) the "native currant-borer," (*Trochilium caudatum*,) both lepidopterous, and belonging the family ÆGERIDÆ. Then there is the "currant-beetle," (*Psenocerus supernotatas*,) which is the real "American currant-borer," and is, perhaps, more destructive than either of the other two named species, but this insect belongs to the *order coleoptera*, and the diversion *longicomia*. Bugs (*Hemiptera*) and lice, as well as scab or scale insects (*Homoptera*,) also infest the currant bushes.

Therefore, in this multitude of enemies which infest a single plant, shrub, or tree, it is of vast importance to know which of these we mean, when we speak of remedies for their destruction. Still those species which destroy the foliage we can readily see, and know how to approach them. But those which excavate the canes, eating out the pith—which is as the marrow to a bone—and are, in all their destructive operations, hidden from our view. The infested canes will, however, exhibit an unhealthy and mouldy appearance, so that they can readily be pruned out and burned in the spring, before the mature insects escape from them. For minute descriptions of these insects, and interesting and useful histories of them, we can only refer our readers to that excellent practical journal, the *American Entomologist and Botanist*, published at St. Louis, Mo., and edited by Charles V. Riley, Esq., at $2 a year, and ought to have a large circulation in so populous, wealthy, and intelligent a county as Lancaster.

We are not sure, however, that we know exactly to what insect the author of the above extract refers, when he speaks of *the* "currant worm," for this shrub has a number of *worms*, which, in one way or another, prey upon it. The "American currant moth,"—above named—is not a dark brown, but a dull ochery yellow in color; nor does its *pupa* remain all winter in the ground. It emerges forth a moth during the summer, which deposits its eggs on the currant stalk, where they remain all winter, and are hatched out about the beginning of the following summer. Its *pupa* is black, and may be found "naked," or nearly so, immediately beneath, or on, the surface of the loose soil, about the middle or end of June. The *larva* is a true "caterpillar," about an inch in length, of a yellowish color, with rows of black dots over its whole body, and one large one on the head. It belongs to the order *Lepidoptera*—butterflies and moths. Nor can the "imported currant worm"—which is more numerous and destructive in this country aleady than our native species—be the one alluded to. The "fly" of this species does not belong to the "millers," nor are the wings of a "dark brown color." The body of the male is black, and the female is a honey yellow. The wings are clear and glassy, the veins or nervures alone being brownish. The larva is a "false caterpillar;" has 20 feet; is of a green color, with black spots; about three fourths of an inch in length, and has the habit of curling under the hind end of its body. It goes generally into the ground to change to the *pupa* state. This is at least the usual habit of the last brood, for there are two broods in a season. It comes forth about the end of May, and then deposits its eggs for the first brood on the gooseberry and the currant. It is the *nematus ventricosus*, and belongs to the order *Hymenoptera*—bees, wasps, saw-flies, &c. The native currant worm belongs to the same *order* of insects, and is also a saw-fly, (*Pristiophora grosulcoria,*) and also attacks both currants and gooseberries. The larva is a uniform pea-green, and the fly, both male and female, is black, with yellowish markings, and the wings are transparent. These, therefore, cannot be *the* currant worms *Mr. Wardner* alludes to above.

R.

GRAPE-BERRY CURCULIO.

(OCELIODES INEQUALIS—*Say.*)

This is a new enemy to the grape, and although comparatively unknown to Pennsylvania, and especially to Lancaster county, it may be of sufficient importance to say something about it in advance, so that when it *does* make its appearance in this locality, we may not be altogether ignorant of its presence and its habits. It has been a long time since Thomas Say described this insect—more than a third of a century ago—but at that time little or nothing was known of its habits—indeed, it is doubtful whether Say himself knew it infested the grape-berry. The late B. D. Walch has done more, perhaps, to illustrate its character and development than any other man in this country. The *larva*, according to this author, is a footless grub, about one fifth of an inch in length, cylindrical behind, and tapering towards the head. The head is comparatively large, horny, and of a pale brownish color; the jaws are robust and acutely pointed. The color of the body is yellowish-white, and from its semi-transparency the dark stomach shows through it. Each segment of the body has, on each side, a large, fleshy, acutely-pointed tubercle, and two similar ones on the anal segment, pointing backwards. The mature beetle is black, and covered with short appressed whitish hairs, giving it a grayish tint. The body is about an eighth of an inch in length, and nearly the same in breadth; convexed, round, and seed-like. The punctures and striations on the snout, thorax, and wing covers are very coarse and deep for so small an insect. The *tibea* on the front and middle pair of legs are armed with a large rectangular tooth, near the outer base, and all are of a dull brick-red color. This curculio stings both the wild and domestic grapes in June, or early in July, and for the last three or four years has been hard on the Concords and Isabellas, near Cincinnati, South and Central Illinois, Danville, Ky., and at Big Hill Vineyard, in the latter State, sixteen acres oı grapes were entirely ruined in one season by this insect.

Remedy.—Look for them in June, and shake them off the vines on a white cloth. They fall readily, and sham death.

R.

HOW TO BE SURE OF GOOD FRUIT.

BY LEVI S. REIST.

How often do we hear the remarks, "it is not worth while to plant apple and pear trees, as those we have are not bearing; we have no fruit, nor can we for years raise any more." This ought to be no excuse. We ought to plant all the time, so that when fruitful years return we may have fruit trees ready to bear fruit.

A great deal can be done, however, by observation. Some apple trees, or some varieties, did bear more or less through our barren years; for instance, the Pound apple bore well all the time, so did the Krouser, and some others. If you have shy bearers on your premises, graft them over with Pound and Krouser, or other varieties, which bear well. The Pound apple is subject to a disease in the butt of the tree, consequently grafting will improve the trees.

There is still more benefit in managing pear trees, the best and most popular of which are the Bartlett, Flemish beauty, and Beurre clairgeau. They are all fast growers, and bear whilst quite young. If you get in a nursery of pear trees, and you can have no choice varieties, then take the most thrifty trees, without regard to their quality, and afterwards you can soon re-graft with favorite varieties. Or, if you have already pear trees on your place that are worthless, or will not bear, then graft them over with the varieties I have named. Try and graft a few limbs on your old choke pear tree, and in a few years those grafts will be loaded with fine fruit—this has at least been my experience. Some of these leading varieties will not sell by the bushel or peck, but, if they do, it will be at a high rate. I was offered eight dollars per bushel, by a fruit dealer in Lancaster, for the Beurre Diel, some of which I have still on hand, and I intend to keep some till the 19th of January, when the Pennsylvania Fruit Growers' Society will meet in the Orphans' Court-Room, in Lancaster. The Bartlett, Beurre clairgeau, and Flemish beauties will bring, in the large cities, from five to ten cents each. I hope that some will make the experiments on the fruit I have suggested, and report their success to our Horticultural Society.

Strawberries and raspberries can be raised almost everywhere; all that is wanted is to plant and keep them clear of weeds, &c.

WHAT CAUSES BLIGHT?

This question involves a number of other questions. I will allow my friend, S. S. Rathvon, to give the entomological side of the subject, while I will, in my usual rambling way, put down the thoughts as they suggest themselves. This reminds me of Robert Burns, commencing with—

> "Which way the subject-theme may gang,
> Let time or chance determine;
> Perhaps it may turn out a sang,
> Or probably a sermon."

My object is, however, to present re-told as many an "old song," and yet of interest.

The High Germans gave the name of "Blichfiur" to the sudden blasting of the leaves on trees or shrubs, rendered in English to "Fire-blight."

I shall not occupy time or space with repeating the various notions of the ancients, but simply consider vegetation as organized beings, and the intimate relation existing between plant and animal life; then the effects of frost, heat, and fungi, and the investigations made and published, touching this branch of the question.

Modern research has made it difficult to say where the vegetable kingdom really commences, and the animal ends, when we include the lowest forms of fungi and animaculæ. For instance, De Barry has shown that the *Aethalium Septicum*, which appears upon decaying vegetable substances, in one of its forms, is common upon the surface of tan-pits. In this condition it is, to all intents and purposes, a fungus, and formerly regarded as such; in another condition, the *Aethalium* is an actively locomotive creature, and takes its solid matter as food. This may seem strange, yet consider the Polypes or Corallines. Those minute creatures propagate by budding, (germination,) and are of an arborescent habit, with joined branches and stems, supported on a kind of root, in which neither pores nor polypes are distinguished. On the surface of the aggregated Corallina, which looks more as if built up as a plant, from carbonate of lime, into a plant or stoney mass, instead of woody tissues. An ordinary observer would suppose them to belong to the vegetable kingdom, i. e., certain kinds, at least.

In vegetation, we find cells and nuclei. Huxley says: "Protoplasm, simply or nucleated, is the formal basis of all life." Although Mr. Huxley, as well as Darwin and Tyndale, says many things that are true, yet neither they, with all their chemistry and philosophy, are able to give an explanation of what constitutes the composition of living matter, or whence the protoplasm or nuclei derive their life and motion.

This is a secret of divine wisdom and power, past finding out. So let us step softly. I will stop, lest I get to "sermonizing," and return to plant life. Suppose a peach tree, the roots anchoring it in the soil, with its spongioles, like minute sucking and filtering tubes, to draw moisture from the soil, and such pabulum as it may find needful to supply the conditions of certain elements, required in eliminating blossoms and fruit, the ultimatum of its being and organism. The pith or central axis of growth, was at one time thought as essential as the marrow in the bone. It arises from the neck of the stem of exogenous plants, and terminating at the leaf bud, with all of which, whether they are lateral or teminal, it is in direct communication, constituting a reservoir of nutritious matter for the young leaves when first developing. Light, heat, and air, combined wtth the gases, perform their respective offices. So the plant feeds, perspires, or exhales and breathes, as it were, through its lungs, the leaves. Capillary attraction in in the minute tubes pumps up the juices, which circulate and become elaborated, and the various functions are performed to build up the tree, put forth its leaves and blossoms, and yield its luscious fruit.

This is healthy action in a healthy tree. Now what constitutes the "yellows," or disease of the tree? I may not specially direct all my remarks to ihe peach tree only. Some may apply more generally to other diseases than the "yellows." One, claiming to have made peach culture a specialty, says: "Rarely do we meet with a peach tree on a southern slope stricken with the 'yellows,' while aged healthy trees are invariably found in such places in perfection. I have some trees at the present moment in my mind's eye, so old that I can find no one to tell me their age exactly, which are growing on the south side of some buildings, models of health and productiveness." He then enters upon his mode of culture and success of the different sorts, extensively. The article is signed Melocoton. I set it forth that others may direct attention to localities of the kind, for, if true, it forms a valuable consideration. In the Agricultural Report for 1871, the Microscopist, Mr. . . . . , of the department, informs us that the "yellows" is supposed by many fruit growers to originate in spring frosts; also, that the disease is unknown in Europe. Again, he says the "soil on which the 'yellows' of the peach flourish will produce healthy peach trees, if they are grown under glass structures." Such a structure would also protect them from frost, in my opinion. He states that in his experiments, "maceration of the bark of the trunk and branches exhibit the presence of albuminous matter, in which a profusion of mycelium is found. When the albuminous matter is in profusion, monads and fungi readily grow, but the converse conditions give opposite results; hence the absence of fungi in the solutions of the bark ot the roots—the bark of the roots having a very limited portion of albumen. Solutions of the healthy bark gave no signs of fungi." He adds: "The experiments are frequently repeated, giving uniform results. The evidence thus furnished in the investigation of the 'peach-yellows' favors the view that when the mycelium is formed on the wood, the cambrinus cell layers are deposited between the mycelium and the fiber, inclosing, in this way, annually a sheet of mycelium, which continues to grow, and necessarily becomes highly compressed or felted." I may not be competent to judge what he means by his annual sheets of *mycelium* and *felting*. It is a wonder that no vegetable physiologist has taken serious objection to his entire experiments. Let any one try the experiment on any albuminoid vegetable, destitute of quinia or tannic acid, and, in less than six days of maceration, both fungi and animalculæ will be developed. In the diseased tissues, albuminous matter may be more abundantly present than in healthy bark, combined with tannic acid, which prevents the formation of the proper nidus. Ferments are of an albuminous or glutinous character, and produce germs of *penicillum glaucum*, which is a fungus also.

But in his theory about the mildew on the grape caused by "atmospheric pressure on the sap in the leaves, to pass through the pores to the surface, depositing albuminous juice, the food of the fungi; then a high temperature following, all the conditions necessary for the formation of fungi are present," he adds: "It has long been observed that rust, mold, mildew, and smut follow such a course of atmospheric variation." In short, he states that pale green or yellowish leaves are always infested with fungus, while those that are glossy or dark green never are. He does not prove by this that the fungus is the cause of the disease; it may be simply a secondary result, induced by the albuminous secretions on the leaves. Former experimentalists accounted for this diseased condition to a change of the humors in the tissue: First. Excess of heat, causing the aqueous sap to be vaporized, and depositing the thicker albuminoid matter on the surface, so as to clog up the stomata, produce stagnation, and form the nidus for fungus development, like other decaying matter. This certainly needs no atmospheric pressure, more than is exercised at all times, under like conditions, on the healthy or diseased leaves, becoming pale and spongy, and the breaking pores clogged up by albuminoid matter, so as to exclude the air, and transform the chlorophil or green coloring matter.

This result is produced by excessive transpiration during a heated term of dry weather, the watery portions of the sap are evaporated, and the thicker albuminous portion lodged upon the surface of the leaves. This takes place, no matter how the atmospheric pressure is, as that, like the heat, would act (all things the same relatively) upon all the plants—leaving the question, Why are some so clogged up, and others not? Therefore, we must look for a radical cause preceding the former, whether in the soil, planting, pruning, or variety of the plant, and the change induced by planting, or rather transplanting from one soil to another; the delay or interruption while so doing; in short, any, or a combination, of these causes may affect the normal flow of the sap, or full action of all the vessels, to induce weakness, so as to be less able to resist the action of the heat, etc. So, some men are sun-struck, and suffer or perish, while others, under the same circumstances, escape. This is a common sense view, and I could produce any amount of evidence that would go to establish it. Depletion, whether by evaporation, aphids, or insects of any kind, may do the same, but when an excess of moisture is in the plants, a degree of depletion may do no harm. Nature ever seeks to establish an equilibrium. As regards frost, I will say observation has proved that a few warm days in early spring may start the buds, and subsequent frost retard them, and this interruption may leave its effects to follow by other concurrent circumstances, either surmounted to avoid, or increased into, pernicious results.

I will give a case reported in my own words, where, in early spring, the frost in the ground yet locks up the spongioles or rootlets, so as to be dormant. A few bright, sunshiny days may start the sap above ground, the pith or store-room to the buds, wake up to motion, starting the leaves. This starting will draw upon all the cells to supply the action, while the root or base of supplies is under an embargo. The result is, that the tree may put forth vigorous leaves, and appear to flourish, but, alas! all the resources exhausted before the evil can be prevented. The sluggish supply from the root has to struggle through the exhausted cells and tubes, shrunken up, requiring for their own restoration the full supply, and too tardy to reach the advance skirmishing force, who, faint and starving, succumb, and all the leaves die, as by a stroke of lightning, apparently as suddenly. This I have myself witnessed. There is nothing strange about it. The functions stop, actions stop. So when the heart no longer beats, and circulation stands still, the human machine stops, and decay and dissolution must inevitably follow.

Having already written more than I intended, I will only add that disease, and the withering of leaves in plants, is not only caused by insects or by fungi, but various complications can take place to bring about like results in plants and animals.

This subject is extensive, and by no means exhausted. Of course, various plants, localities, and treatments will vary the results, and sometimes we meet with very conflicting statements, as resulting from experience, in which this difference is not taken into consideration. Hence, close examination as to the various conditions that invest each case must be examined. The parasitic fungus on the living plants, the fungus resulting from, or found on, decayed plants, the depletion and boring of insects, the effects of heat, cold, drought, or excessive moisture, are all questions that should be had in view, and necessarily the data given, before a safe verdict can be given on any special case.

J. S.

BREEDING DAIRY STOCK.

BY COL. O. O. POTTER, OF CRAWFORD COUNTY.

I was surprised on opening the *Weekly Republican*, on Saturday last, to see the announcement in your published programme, that I would address the Convention this evening upon the subject of "Breeding Dairy Stock." Simultaneously, letters from our enthusiastic president and polite corresponding secretary, explaining and apologizing for the delay in notifying me, with a sly hint from the former not to be tedious.

This must be my apology for the thinness and brevity of my address to-night.

To dairymen the subject is one of vital importance, as without good dairy stock the success of the dairyman must be at least moderate, while on the contrary, with a first-class dairy their success is assured, demonstrated by a swelling bank account, astonishing not only his neighbors but himself. That is the ultimatum to be sought by the breeder of dairy stock.

First, the milking capacity of his cows, one characteristic of which, and a very important one, too, is the staying capacity as a milker. It is sometimes the case that a cow will give a very satisfactory quantity of milk during a brief period of the season, while the grass is freshest and most succulent, and then gradually dwindle away a mere mess, and go dry long before her more unpretentious companions have thought of going out of business. In this respect, cows differ in a very important degree, and such impostors should be marked and promptly sent to the shambles. By milking capacity, then, is meant not only the abundance of the flow during what is called the height of the season, but also the characteristic of a persistent milker, continuing, with proper care and feed, up to such a period as shall not leave an unreasonable season of rest.

Secondly, in estimating the value of dairy stock must be considered the quality of the milk, and, thirdly, the health of the animal. A strong constitution, and what is termed an "easy keeper," are important characteristics of dairy stock in this variable and severe climate.

I have thus hinted at what is most profitable to breed, before trying to tell you how to produce it; and here I might dismiss the subject, exhausted, in three words, in the adage or aphorism, that "Like begets like."

In breeding, this is considered a fundamental principle, and although in fact it is not strictly true, yet it contains such a hint regarding the great mystery, that we accept it for its brevity, and perpetuate it amongst our household words. It is not true that the offspring is precisely like either, but possess the blended characteristics of both, often characteristics possessed by neither parent—for instance, it is most frequent that the color of the hair is unlike either parent, but, if traced, it will generally be found that the color has been inherited through some ancestor, near or remote; and what is still more frequent, the offspring may possess one characteristic peculiar to one parent, and another characteristic peculiar to the other parent.

The study of hereditary descent is one of great interest, and no breeder can afford to be unmindful of the subject.

An interesting feature of this subject, is that the offspring may inherit the acquired characteristics of their progenitors. When the ancestors for generations have been trained to some peculiar business, like the shepherd dog, the fox hound, and the bird dog, with what singular instinct the puppy follows the acquired qualities of the parent, and how difficult it is to train one to the business of the other. The draught horse, whose ancestors on both sides for generations have been familiar with the collar and the work of moving ponderous loads, and guided by the same words from the first time the harness is fastened upon him, without scarcely the form of breaking or training, falls into the ways of his forefathers; the pressure of the collar creates no surprise, the moving of the same ponderous load is evidently to him the most natural thing in life, and just what he was expecting; he instinctively obeys the stereotyped language of the driver, as though to him they were household words.

A slight glimpse of a transaction in stock, rather pertinent to our subject, comes down to us well authenticated through the glamour of some thousands of years, in the story of that shrewd transaction of Jacob with father Laban, as recorded in the book of Genesis. We are told that Jacob bargained with his father-in-law, Laban, for all the cattle, sheep, and goats that should be born speckled, spotted, or ring-streaked; and Jacob took green rods, and peeled them in rings and streaks, and placed them in the troughs where the cattle came to drink, that the appearance of the rods should make an impression upon the minds of the cattle that might be transmitted in the color of the offspring, and that Jacob managed to have only the stronger of the cattle to drink at the troughs where the rods were placed, that the stronger of the progeny might become his own, and only the feebler of the calves, lambs, and goats go to the share of the old gentleman, and the result of the business is hinted at in these words: "And the man increased exceedingly, and had much cattle." And so from Jacob to the Darwins of our own day, the principles of hereditary descent, as now dimly understood, have governed reproduction in animals as well as the human race.

If the object of the horse-breeder is to produce a trotter, he seeks for the parents, those bred from strains of trotters, and so throughout the various classes.

If we would breed Durhams, we select the parents from that stock; if Devons, we are not likely to select the dam from a herd of native cattle, or the sire from the Alderney. So it is obvious, if we desire to breed for dairy purposes, we should see those most distinguished for their milking capacity, and here naturally arises the question, what breed of dairy stock is to be preferred?

The breeds most distinguished in this country, as possessing, par excellence, the characteristics of the dairy, are the Ayrshire, and what are called the Channel Island cattle, including the Alderney, the Jerseys, the Guernseys, and possibly some others, bred upon the various islands of the English channel and vicinity. We might mention certain other breeds for which great milking qualities are claimed, which are bred upon the continent, but we are but little, if any, acquainted practically with the latter, and therefore, forbear to discuss them.

Those breeders who have tested practically the breed known as the Ayrshire, I believe, with scarcely an exception, speak in high terms of their milk-producing qualities, and it has been my fortune to become somewhat familiar with this breed myself. About fifteen years since, my brother, H. C. Potter, of New York, purchased of an importer, near that city, a pair of Ayrshire calves, and sent them out to the old homestead, where I now reside. The cow remained on the farm until last fall, but she has left her mark upon our herd, and, as a rule, the best milkers show liberally of her blood, although I will add that the old cow herself was possessed of but moderate milking capacity, yet I am satisfied the blood of the Ayrshires was there, and shows in her progeny, even when mingled with that of another breed, undistinguished in the dairy. I must not, however, forget to add that the Ayrshiré possess in a large degree one quality or characteristic, not altogether desirable in dairy stock, and that is a restless, nervous timidity, or, in other words, they are too high strung to be always gentle, docile, and agreeable. This, as all will admit, who have had much experience in milking cows, is an indispensable quality in a dairy herd—yet, when crossed with the staid and quiet Durham, they have scarcely failed, as far as I have observed, to partake most charmingly of the Durham disposition.

The Ayrshire are easy keepers, of robust constitutions, and as beef-makers are scarcely inferior to the Durham.

I hazard the opinion that were our choice cows to be crossed with Ayrshire bulls, it would result in immeasurable benefit to our future herds.

With regard to the other breeds of milkers, the Alderneys and their cousins, we need enter into no lengthy discussion. All that their friends claim for them, is that their milk is rich in butter-making qualities. We are in the cheese business, and with all respect for the opinions and feelings of my friends, who possess prejudices in favor of the Alderney cow, and I must say, as said the old lady of her neighbor, "she ought to be good, the dear knows, for she is homely enough, any day." A fatal objection to all diminutive animals for the dairy, must always be the absence of beef-making qualities, when age or accident unfits them for the dairy herd.

That the Ayrshire is a distinct breed, and that the characteristic of the breed consists in the great milking capacity of the cows is, I think, generally conceded, and so long have the breeders of this class made this characteristic a specialty, that if there is anything that becomes hereditary, this quality has become hereditary in them, and were I to attempt the specific undertaking of breeding the greatest milkers, I should as naturally seek Ayrshire stock as a starting point, as if wishing to breed a great trotting horse, I would seek the dam and sire combining in the greatest degree the blood of the old Messenger, and whose less remote ancestors are illustrious in the records of the turf. Nothing is truer in breeding than that "blood will tell," and this holds good as well in one race of animals as another, from man to monkeys.

I beg leave to add, that I am not interested, financially, in Ayrshires, and have none to sell.

But the laws of hereditary descent may be applied to your own herds as they are. Almost every farmer has, I hope, one or more first-class cows. Possibly, and it is not unfrequently the case, that some great milker, illustrious in the family annals, has perpetuated herself through many generations, and it has always been said of her that her heifers always made good cows, and so on through the generations, and that is the way to breed good cows, and, moreover, be careful to save heifers for raising only from those cows that have demonstrated the fact that they are first-class, but save them sure.

Be not controlled by a penny-wise and pound-foolish niggardness, which shall lead you to sacrifice a heifer calf from the old favorite of the herd on account of the cost. I know the temptation to swell your account at the factory is strong, and the calves are great drawbacks, but remember that old "line-back's" period of service must necessarily terminate soon, and it is vastly better that one of her own daughters should take her place with all the chances in her favor of possessing her mother's many virtues, than that the calf be sent to the butcher, now that a few pounds of milk may be saved, and a purchased stranger fill the old cow's place when she is gone.

And here let me hint to you that in the breeding of milkers, it is not, after all, the breeding exclusively that produces the milker; it is the feeding as well as the breeding. A stunted calf is not as likely to make a good cow as one that is kept thriving from its earliest childhood to maturity, and I doubt not that the kind of food has much to do in developing the milking capacity of the growing heifer.

In the summer, a well-watered pasture of sweet and succulent grasses, and some shady nooks as screens from the fierce heat of the sun when the dog star rages; in winter, grass cut and preserved with the juices in it, with the scent and sunshine of the summer days mowed in with it, not the red-looking, ripe, woody, fibrous, late cut stuff, sometimes called hay, and which long since would have passed out of vogue had the poor cattle the power to express their feelings when the unsavory dose is placed before them. Grass so preserved, with some messes of bran and roots, a warm stable, and a comfortable place to lie down to rest, will have a tendency to develop milking capacity in a well-bred heifer, and if her pedigree happens to be rich in milkers, if she don't make a good cow it is no fault of the breeder and feeder.

But there is another side to this question. I have urged the necessity of selecting your heifer calves from families of well-known milking capacity on the side of the dam. I also desire to emphasize the equal importance in the selection of males from families possessing the same characteristics. This I know to be largely lost sight of in the breeding of stock designed for the dairy. Why a point of so vital importance should be so generally overlooked and neglected, is most singular and unaccountable. It is not uncommon for the average farmer to select his heifer calves for rearing from the best milkers, but it is uncommon, so far as my observation extends, for the average farmer to use even ordinary care in the selection of the male with reference to the milking capacity of the family from whence he springs.

Thoroughbred, be he Durham, Devon, Hereford, or what not, although perfect in all the points which distinguish the several classes, and beautiful as a picture, may be utterly worthless as a getter of dairy stock. If his pedigree has not been illustrious at the milk-pail, let the dairy-breeder discard him, and accept one of humbler birth, whose mothers in long succession have been sainted in some family calendar for their milking virtues.

It is common in the selection of cows for the dairy to rely much upon what is called "her points." Some look to the shape of the horns, others to the shape of the udder, some judge by the general shape of the animal, the color of the hair, and others by something else. The points of a good cow are ingeniously combined in the following lines, with which I doubt not you are all familiar, but, which, nevertheless, I may be permitted to repeat:

She's long in her face, she's fine in her bone,
She'll quickly get fat without cake or corn,
She's clean in her jaw, and full in her chine,
She's heavy in flank, and wide in her line,
She's broad in her rib, and heavy in rump,
Straight and flat back, with never a hump,
She's wide in her hips, and calm in her eyes,
She's fine in her shoulders, and thin in her thighs,
She's light in her neck, and small in her tail,
She's wide at the breast, and good at the pail,
She's fine in her bone, and silky of skin,
She's a grazier without, and a butcher within.

Which jingles very well, and shakes several good points together concisely, but yet a cow may possess all these points; she may be a thing ot beauty, but not a joy forever to her master. In those various modes of judging, all is vain and uncertain. The milking capacity is to be preferred in the dairy herd to the points, and I would prefer the knowledge that my heifer is descended from long lines of mothers, illustrious in the herd of some private family, than that she is the possessor of all the perfect points, laid down in the herd-book. In short, gentlemen, blood will tell, but if it is not the milk-producing blood, we have no use for it in our dairies.

Finally, gentlemen, the dairyman who cannot afford to raise his own dairy stock, but relies upon haphazard purchasing here and there, is taking more risk than the ordinary profits of the business will warrant. Those who sell, sell the poorest, and save the choicest member of their herd, and when you purchase you get, as a rule, something the seller could not afford to keep.

If you can make dairying pay with a large percentage of scallawag cows upon your hands, then with a herd of the best you can get rich. The cost of keeping a good cow is generally less than that of a scallawag, and her products should be equal to more than two scallawags.

Gentlemen, Crawford county is the natural home of the dairy. The sweetest grasses are indigenous to our soil; they cling to it tenaciously, and are driven out only by growing greed and persistent abuse. Our hillsides and valleys are threaded with pure streams of living water. A ready market awaits our products. Mechanical skill has perfected the apparatus, and the factory system has reduced the business of dairying to a simple, easy, and certain basis. Capital and commerce have created the factory system. It remains for the farmer to avail himself of the advantages which it offers. A little of the energy, skill, and study, which a successful merchant, manufacturer, or professional man is compelled to exercise, in order to achieve success, will, in a few years, bring wealth and competence to every over-worked, drudging, and discouraged farmer within the bounds of our county.

AMERICAN LIVE STOCK.

ADDRESS BY L. F. ALLEN, BEFORE THE NATIONAL AGRICULTURAL CONGRESS, AT PHILADELPHIA, 1876.

The subject on which your executive committee has invited me to address you, viz: "Our live stock interests, in their history, condition, and prospects," is far too broad in its scope to be compressed within the limits of an address on an occasion like the present. Indeed, it can only be treated in a manner suggestive, rather than practical, or even historical. The history of the live stock of the United States, from the first settlement of our Atlantic seaboard, to its present wonderful expansion, to the shores of Pacific, would be almost a history of the people themselves, so close has been the association of their domestic animals with the fortunes of the agricultural population. The limits of this paper will only allow me to touch on the introduction of our domestic animals, and follow them briefly, for about two hundred and fifty years of progress, into their present condition and prospects for the future.

It is a very broad subject—the entire category of our farm stock—embracing the nobility of the horse, the utility of the ass, the hybrid offspring of both, the mule; the branches of bovine race: the cow for milk, the ox for labor, the bullock for beef, the sheep for its flesh and wool, the swine for flesh, lard, and oil, not omitting poultry, and even the "little busy bee," which contributes to our household comforts and luxuries. You will, therefore, excuse the brevity of my remarks in each department, as any questions suggested may more fully be studied by reference to many able works devoted to different branches of this interest.

First, in order, may be mentioned—

THE HORSE.

His domestic history is coeval with that of mankind. He has contributed in no small degree to man's civilization. The most ancient of human annals, both sacred and profane, have eulogized him. His prowess has extolled in histories of war; in domestic servitude, his indispensable labors have been gratefully acknowledged; in luxury, he is an indispensable agent, and, altogether, the noblest animal ever under human control.

The first introduction of the horse to the vast territory now composing the United States of America, was, in all probability, made by the Spaniards, on the coast of Florida, some years previous to the settlement of early English and other European colonists, on our Atlantic shores. History gives us little or no account of the breeds and characters of those early importations. The Florida Spaniards came out chiefly as gold hunters, and what horses they brought with them were, in all probability, of the Andalusian or ordinary Spanish race, which were, for many centuries, bred by Moors, in Spain, and, subsequently, by their Castilian conquerors. Those horses were small in size, good in draught, and, under saddle, hardy in constitution, and capable of undergoing great fatigue with negligent treatment; in fact, the most useful class of animals for them and their successors. Without much, if any, improvement, they now plentifully inhabit Texas, California, New Mexico, and Mexico proper. They do not really belong to the class "American horse," as we now understand that classification.

The settlers on our Atlantic coast, beginning about the year 1616, brought out the horses of their own native countries, Holland, Great Britain, Ireland, Sweden, Denmark, France, and Germany, being laid thus under contribution. Great variety of character was thus introduced, and, as their importers were men of narrow means, the animals were, probably, not of the choicest kind, either in blood or quality, but very useful in the rude agriculture of the time. As these horses shared the hardships and privations of their owners, no marked improvement could be affected until the introduction of superior animals by later immigrants.

As the colonies grew in population and strength, attracting increased attention from the English government, under which they were all ultimately combined, immigrants of wealth, official dignitaries, and army officers brought out many valuable horses, some few accounts of which date back to the year 1700, among which were choice specimens of the draught variety, as well as saddle horses; but the roadster, as we now know him, was then undeveloped, from the lack of good roads, and light vehicles. Within a few years after 1700, several fine blood-horses, of both sexes, were known to be imported into Virginia, New York, and other States, both North and South, many of the earlier and later immigrants of those States being great admirers of horse quality. These later importations were closely interbred, and widely distributed, and crossed on common mares of the country. Thus, a rapid improvement was made in the style and appearance of our horse-flesh generally, as well as in their superior utility and value. So marked was that improvement, that, at the outbreak of the Revolutionary war, our military officers were usually equipped with horses of superior blood, quality, and action. Indeed, many of the brilliant achievements of our Revolutionary army, owed a share of their success to the thorough mounting of cavalry, and the excellence of the horses ridden by commanding and staff officers of foot divisions and corps.

Recovering from the calamities and poverty of the war, as the circumstances of our people improved, the study of cultivation of their horses rapidly increased, and the earlier years of the present century produced many animals which, in high breeding, style, and execution of their work, equalled those of any other country, either on the race-course, under saddle, in the harness, or the draught.

A brief notice of the various classes of horses, now in approved use and cultivation among our American people, may be germane to the subject, and first, in order, may be named the English thoroughbred or race-horse, as originally introduced into the American colonies, and since continued in our States. He has been the foundation of the highest excellence yet developed for all ordinary use, aside from the heavy and slower draught. About two hundred years ago, during the reign of Charles II, the race-course first began to attract the attention of the nobility, and other wealthy aristocracy of England, and it has been continued down to the present time. As a consequence, speed, bottom, hardness, and endurance were the qualities chiefly sought in the development of the race-horse. For centuries previous, they had fine horses in England, yet they needed improvement, if possible, and choice selections were made from Egypt, Arabia, and the Barbary States for stallions, and sometimes mares, to infuse their good qualities in the English blood.

Many crosses of foreign stallions were made on the native English mares, and, no doubt, decided improvements were derived from their use; but, after all, the size and more muscular qualities retained by the descendants of those crosses were, mainly, of the original English character, and have been perpetuated, both in England and America, to the present day.

Late in the last century, and occasionally down to recent years, we have received importations of choice stallions from Asia and Africa, near the Mediterranean coast, but, in justice, I must remark, that, although some of them were of the highest symmetry in form, action, and appearance, yet when crossed upon our well-bred mares, a superior impress on their descendants, except in few instances, has not been eminently noticeable. Did time permit, I might go into particulars within the limits of my own observations, but the fact must remain, with only a general remark of its truth. Whether the thoroughbred horse, in the United States, has been kept up to the standard of excellence at which he has arrived in England, or improved beyond him, an instance or two may determine. I have been unable to learn the best running time of the race-horse in England, and, therefore, a current comparison between the speed of the American and English horse cannot be made.

In the great national four-mile race, of three heats, on Long Island, New York, in the year 1823, between the stallions, American Eclipse, bred on Long Island, New York, and Henry, bred in Virginia, the first heat was taken by Henry, by a head only, in 7.37½. The other two heats were taken by Eclipse, in 7.49 and 8.14, yet it was never exactly known what was the very best time Eclipse could make, only when matched with a nearly equal competitor, as he was called a lazy horse, and bore the whip freely.

The Kentucky bred stallion, Lexington, on the New Orleans four-mile course, in the year 1854, won his race in 7.19¾. Fellowcraft, also a Kentucky bred stallion, won a race on the four-mile course, at Saratoga, in the year 1874, in 7.19½. These are the two shortest races ever made, so far as records are given, thus leaving the American thoroughbred the peer of any others in the world.[*]

We may well suppose that the superiority of the thoroughbred horse, in the combinations of speed, action, wind, bottom, and fineness of proportions, has been fully determined, and that an infusion of his blood would be sought and worked into a large class of our miscellaneous bred horses for other purposes than the race-course, or simply for the gratification of taste and pleasure. Among the most notable class of the thoroughbred crosses, upon the better ones of miscellaneous character, is

THE AMERICAN TROTTER,

Which we claim as solely an American production, within the last forty years, in the highest development of his speed.

A detailed history of the trotter would require many pages, for which no time can here be allotted, and the horse literature of the country only can give it. Suffice it to say, however, that his descent has been largely drawn from the thoroughbred for many years back in his ancestry.

Trotting horses of celebrity have been recorded in the English periodicals of years ago, particularly Bellfounder, who trotted nineteen and one half miles in an hour; but in the trotting horse, classed by himself, England, as compared with America, has yet made no distinguished record, and that the American trotter has been most skillfully bred and trained to his recent astonishing achievements, is a testimonial to our native enterprise beyond that of any other country. Thirty years ago, a horse that could trot a mile in three minutes, was considered a remarkable animal. That three minutes has been reduced from year to year, until, in 1875, the mare, Goldsmith Maid, at eighteen years of age, made her mile in 2.14, and repeated it in the present year, 1876, in the same time. We now have scores of horses, which make their mile in less than 2.30, on the trotting courses of the country, as well as hundreds of them who easily do their mile in three minutes speed. Thus, the American trotter, stands at the head of his class, over all others in the civilized world, as yet discovered.

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[*] Since the above sentence was written, the horse Ten Broeck made a race at Louisville, Kentucky, in 7.15¾, beating Fellowcraft three and three-fourths seconds.

If it be inquired in what remarkable manner the rapid speed and high qualities of the trotter have benefited the ordinary horse stock of the country, the answer is readily given, in the fact that our better class of driving horses have been wonderfully improved in action, as well as in quicker movement, sureness of step, higher pleasure to all who either drive or ride after them, and in the increased marketable price they obtain for their breeders.

Next in order, we may remark, in the absence of a more appropriate name, upon

THE HORSE OF ALL WORK,

Equally adapted to family use, the labors of the farm, or other purposes. I doubt if any part of the world, climate, and soil considered, can show a better class of horses than those bred in the United States, and the neighboring province of Canada. Made up of no particular breed, but an infusion of different bloods, they answer an admirable purpose for almost all uses, so far as size, endurance, muscular action, and longevity are concerned. A composite breed they may be called, if such a miscellaneous admixture can be called a breed at all. They are of all colors and all sizes, from fourteen and a half hands to sixteen and a half hands high, and weigh nine to twelve or thirteen hundred pounds, in fair condition of flesh. They are bred and reared by all good farmers, who make horse rearing a branch of their industry, and are bought and distributed all over the country, in village, town, and city, where, aside from mere fancy use, the horse is needed. Good stallions are kept for service in almost every neighborhood of the land, and of these, the horse-breeder takes his choice for service to his mares, and succeeds in their production, as his skill and care may determine. There is another example of the value of our horse of all work in Great Britain, which can boast as good horses, of their kind, as any part of Europe. Since the street rail car has been introduced into Great Britain, within the past year or two, it has been found that they had no class of horses especially fitted for that work. It required the sinewy, elastic movement, coupled with medium size, and endurance in our all-work horse. As a consequence, many hundreds of American horses have been purchased in our Northern States and Canada, for export to Britain, for other purposes as well as for street railways, and the trade is still continued to the mutual advantage of both countries.

Another class demanded for exclusive purposes—

THE DRAUGHT HORSE PROPER, needed for heavy farm labors, and drawing the weighty loads in our commercial and manufacturing cities and towns, for which the ordinary horse of our farmers is incompetent. Of this class, if we have any which may be called "ancient" among us—say a hundred years or more—first, in order, stands the Conestoga, of Pennsylvania. The name is a local one, taken from a river of the central part of that State. He is supposed to be a native of Flanders, and to have been introduced by the German immigrants, soon after they settled in Pennsylvania, some time in the last century. This horse is still reared in Pennsylvania, but in smaller numbers than formerly, and in several other States, and is a decided favorite with those who breed and use them. Nearly, or quite, a hundred years ago, when the settlements of that State had extended westward over the Allegheny mountains, when towns began to spring up, and heavy transportation between them and the seaboard became necessary, the huge canvas-covered wagons, carrying six tons, and upwards, of merchandise, were drawn by spans of four to eight horses, with, sometimes, a ninth one, in single harness, as a leader. Those horses ranged from sixteen and a half to seventeen and a half hands high, with bodies solid and bulky in proportion. Long before canals and railroads were known in our country, caravans of those teams were daily seen, at all seasons of the year, traversing the roads over the mountains between Philadelphia and Pittsburg, and with bear-skin housings upon the hames, and an arch of bells above them, with the driver seated on the near-wheel horse, a more picturesque spectacle, of the kind, could rarely be imagined. Their usual rate of travel was about twelve to fourteen miles a day. But those caravans, since the construction of railways, have mostly passed away, and the descendants of the stately teams are now devoted chiefly to agricultural uses, and the drays and wagons in the cities. It is doubtful if a better class of heavy draught than they have ever existed. It is claimed, by some writers, that the Conestoga has been bred to his high degree of excellence by crosses of the thoroughbred English horse, but without sufficient evidence of the fact, as, for the last seventy years, he has developed no trait of the blood horse in his composition, and, in his characteristics, has adhered solely to the type of his original progenitors. Other foreign breeds of the draught horse, of decided excellence, have, in later years, been introduced among us, and are much approved. Among these may be named, in the order of introduction, the *Clydesdale*. This horse is of Scottish descent, of the largest size, seventeen to eighteen hands high, with a ponderous body, stout limbs, hairy at the fetlocks, of high and noble carriage, and unsurpassed in weight and strength. They occasionally reach the weight of seventeen, even eighteen, hundred pounds. They were first introduced, by Scottish farmers, into Upper Canada, where they have been bred in considerable numbers, and are still annually imported. There have been, also, some direct importations from Scotland to the United States. Many of the Canada importations have found their way into several of our States, where, for heavy agricultural and other draught, they serve a valuable purpose.

The *Suffolk Punch*, so called,is a draught horse of English breeding and descent. He is of large size, but smaller in bulk and stature than the Clydesdale, somewhat similar in style of body and limb, but without the hairy fetlock. A few of them have been imported into Canada and the United States, but have not yet acquired the popularity of the Clydes, although of decided excellence, and a model of their kind.

There are two other classes of draught horse introduced into our country, somewhat similar in character, and probable descent, and may be classed in nearly a parallel category.

The *Normans* may first be named, as earliest in importation. They are natives of France, not of like style altogether with the draught horses already named, as they embody more speed in action, with great strength of limb and power of locomotion. They are largely worked in the heavy diligence traveling carriages of France, which they move at five to eight miles an hour on the roads, holding a good trotting gait. They are also used for drawing heavy loads in the cities and towns, and in agricultural labor. Their usual size is sixteen to seventeen hands in height, compact in body, symmetrical in shape, clean in limb, hardy in exercise, and enduring in labor.

The stallions have been of decided service in crossing with our mares of "all work," as well as in breeding with mares of their own kind; for the mixed uses to which they may be applied, are a valuable addition to the the horse stock of the country.

Next to, and partially associated with, the Normans, may be named the *Percherons*. As a rule, they are somewhat larger in size. They are also natives of France, and applicable to the same uses as the Normans, and of equally good shape, style, and appearance. They have been considerably imported into several of our States, of late years, and received with approbation among those who need a beast of their kind. They may be pronounced a decided acquisition, and it is to be hoped that the enterprise of their importers may be liberally rewarded. From the numbers of both sexes now here, a healthful production of their kind, both in general excellence and purity of blood, may be anticipated.

Nor, in our horse category, should the lesser and even diminutive *Pony* be overlooked. For a century or more past, they have been imported into the United States, of different character and style, from the Welsh and English pony of twelve to thirteen hands, down to the diminutive little Shetland, from the northern isles of Scotland, of three feet or less in stature. They are usually symmetrical in shape and appearance, of wonderful strength, docility, hardiness, and endurance. Although of little use as laboring beasts, they minister largely to the pleasure of our families, are the delight of our children, and worthy of attention and propagation, as innocent promoters of luxury and enjoyment. Under proper care and attention, they thrive as well in America as in countries from which they came to us.

THE ASS.

This useful and indispensable animal—useful in mule breeding, as well as in the propagation of his own species—is among the most important items of our farm stock, and worthy of a discriminating notice. On the Eastern continent their utility is of as ancient date as that of the horse, and among many nations and people their labor is indispensable. They were early brought into our American colonies, and from their first introduction until some years of the present century, were widely used in the Atlantic, Northern, and Middle States for the propagation of mules for the West Indies and our southern domestic markets. Since about the year 1820, mule breeding and rearing in the Eastern States, being superseded by the cheaper facilities for producing them in several of the more Western States, the ass has ceased to be either an article of breeding or commerce where they were first imported, and is now rarely known within their boundaries. Yet, in the localities where now most used, he has been improved both in size and quality. Numerous importations have been made, during the last seventy years, from Spain, Malta, and other adjacent countries, of the best blood of his race, and their produce, bred on the females of American stock, have so improved them that we can now exhibit the domestic ass as equal, if not superior, to those of any other country. Would time permit, we might even go into particulars to prove our assertion, but it must now suffice to state the fact in general terms. With us, he is rarely used as a laboring beast, his services being superseded by the mule, as our country is happily from that low class of labor in which his drudgery is needed.

THE MULE.

The origin and history of this peculiar animal is almost as ancient as that of his progenitors—the ass and the horse. He has ever been useful in the industries of the people of many nations, both ancient and modern, and to the development of certain branches of our American agriculture, traffic, and commerce, he is widely appropriated and indispensable. The early mules of Eastern States were small in size, seldom attaining a height of more than fifteen hands, and, usually, less, yet, of great strength in labor, endurance, and longevity; but the western mule has far exceeded him in size, weight, and adaptation to the heavier work demanded of him. It is now not uncommon to find him sixteen, even seventeen, hands high, with a body in proportion, and, frequently, a comeliness in form exciting the admiration of those who are partial to his employment. His uses, in the various labors demanded of him, are so well known that it is unnecessary to name them, and, in comparing him with the mules of other countries, it may be truthfully said, that the American mule has no superior, and but few equals, and thus constitutes an important staple of our agricultural wealth. A proper history of the progress and present condition of either the American ass or mule has never yet been written for publication, other than in detached scraps or pamphlets, yet, they are subjects well worthy the employment of an able pen, and it is hoped that such a labor will be undertaken by some one fully competent to its execution.

AMERICAN CATTLE.

To give a history of the rise, progress, and present condition of this important department of our industry, would be to write an elaborate book, the like of which was written some four years ago; but it has fallen, I fear, too seldom under the notice of those whose interests would be promoted by its perusal, even under its shortcomings and imperfections. However that may be, I shall briefly. yet as accurately as my observation may allow, give some notes and suggestions on their very wide importance. Neat cattle, in the sense usually understood with us, or more strictly animals of the bovine race, were introduced into our Atlantic States soon after the first settlers, came over from Europe. Those settlers brought with them animals reared in the vicinities from which they themselves came, of various nationalities. Their cattle were of no particular breeds or distinctive names, that we have learned, but such as served the wants of the settlers in the production of milk, the propagation of their kind, their meat for food, and their labor for agriculture, animals of a common order only, as improved breeds in those days had not received much attention in the countries from which the immigrants came; anterior, however, to the colonial settlements in what are now the United States, the Spaniards had introduced many cattle from their own country into the territories of Mexico and further south, and in the broad, luxuriant pastures of those regions they multiplied into numerous herds, with little attention to their improvements, as they are are now found and known; but of late years, since the annexation of Texas, New Mexico, and California, they have become quite an article of commerce and consumption in other States.

In nearly all the grass-producing or grazing portions of our older States, as the people progressed in their modes of agriculture, their cattle increased and multiplied, were usually well cared for, and answered all the purposes demanded of them.

In some sections of the country they were better cared for than in others, and possibly improved in quality over the originals from which they sprung; yet as the settlers, after some years, began to migrate to different localities, taking portions of their herds with them, the cattle became intermixed with those derived from other nationalities, so that in process of time, a general intermixture took place, and the name, "common cattle," was only known in their application. This name is now continued, to distinguish them from the improved breeds of later years.

Occasionally, and at different times in last century, tradition has informed us that enterprising men of wealth, had imported some choice cattle of the "improved" blood from Europe—the names of the breeds not remembered—but they were so few, and so little attention was paid to their propagation in their own district lines, that they soon became amalgamated with the common stocks. Yet that the infusion of their blood among the others to some extent, made their progeny better than the older herds, we have good reason to believe, particularly as the working oxen of the eastern States and their superior dairy cows, for some generations past, have been held in high estimation. This assertion may, however, be qualified by saying that the oxen were chiefly used in labor on the farms, and the dairy formed a considerable staple of their agriculture; consequently drawing closer attention to the cultivation of their cattle. In the more fertile fields of the middle States, which were chiefly grain growing, horses were used for labor, and cows in the dairy, mainly for domestic consumption, while the steers and bullocks grown by them, were for meat purposes, or if for labor at all, only for a few years, until the forests were subdued, and the land made clear for horse cultivation.

BREEDS OF CATTLE.

Of improved cattle, we now have several valuable and distinct varieties. A few remarks on each of them must suffice; and first, in order, as they are by far the most numerous in attracting the attention of our farmers, breeders, and graziers, I name the

SHORT HORNS.

Soon after the Revolutionary war, and previous to the year 1800, a few animals of this breed were imported, by two different Englishmen, into the city of New York. The fact of their importation, is the chief thing known about them, as only a few results are now recognized from their breeding. One of the imported cows was taken back to England—"the American Cow," so called, of the English herd-book—from which, afterwards, many noted and valuable animals descended. About the same years, also, two different importations of cattle, supposed to be short horns, were made from England into Baltimore, and taken to the valley of the south branch of the Potomac river, in Virginia, and from there, within a few years afterwards, some of their descendants were driven to the blue-grass region of Kentucky, where they were carefully propagated, and, in after years, crossed by bulls of still later importations, became an important item of the cattle wealth of that State.

We hear of no further short horn importations until, after the war with England, in 1812-1815. Soon afterwards, several importations of them were made into New York, Massachusetts, Kentucky, Maryland, and Pennsylvania. They were industriously bred by their enterprising owners, and the valuable qualities of their own distinct blood, and the improvements, through their crosses upon the common of the country, for most useful purposes, soon gave them a popularity and dissemination attained by no other breed, and since followed by numerous importations into many of our States, and the Canadas. They now stand largely in excess of numbers over all other foreign breeds put together. The various merits of this breed, it is not now necessary to discuss, as different opinions may be entertained regarding them, but the fact may be stated that their recorded pedigrees, in the herd-book, now number more than 60,000 well-bred animals, and, at the present time, they are increasing more rapidly than at any previous period in their history.

DEVONS.

This is a strikingly distinct breed in form and quality, medium in size, uniformly red in color, comely in appearance; and of decided excellence the ox for labor, as his agile form indicates; the cow for milk, when cultivated for that object, and the uniform excellence of their flesh, when properly fed and matured. Nor can there be any doubt of the original distinctive blood of the Devon. Their advocates in England claim them to be as ancient in blood and descent as the Roman rule in that island, many hundred years ago; but by what evidence, other than their peculiar style of form and character, is not known. That animals, allied to them in blood, were brought to America, from England, so long ago as in the seventeenth century, is altogether probable, as many of the native New England cattle, for many generations back, have borne strong resemblances to the Devon, in some of their characteristics.

The first authentic knowledge we have, of thorough-bred Devons being imported into our country, was in the year 1817, by Messrs. Caton & Patterson, of Baltimore, Md., and, in the next year, by the late distinguished statesman, Rufus King, of Long Island, N. Y. By those gentlemen, they were bred and cultivated, and herds from them considerably disseminated in different sections of the country. Later importations of them, have been made into Maryland, Massachusetts, New York, and some other States. There are now several fine herds of them, existing in different sections of the country, but, we regret to say, not in the numbers their good qualities should command, but of excellence quite equal to original exportations. It is hoped, that they will still further increase, until they become numerous among the standard breeds of our country.

HEREFORDS.

Next in order of improved cattle, this breed may be named. The first distinct account we have of thorough-bred ones of the kind, were an importation by the great Kentucky statesman, Henry Clay, in the year 1816. An ardent admirer of fine stock, he saw them in England, in 1815, and purchased two pairs of bulls and cows, which afterwards came out, and were placed on his farm at Ashland, near Lexington. Whether any or what number of thorough-bred produce came from them, we are not informed, as no record was kept, and they are not now known in Kentucky. The bulls were bred to some native cows in their vicinity, but the short horns, which were imported there soon afterwards, superseded them in propagation, and we hear nothing further of their produce.

About the year 1824, one or more Hereford bulls, and perhaps a cow or two, were imported into Massachusetts. We hear of no thorough-bred produce from them, but the bulls were bred to a limited extent on common cows, and no marked result followed, except some grand working oxen, afterwards fed into excellent carcasses of beef. In later years, a few importations of choice animals were made into New York, Ohio, and Upper Canada. Their descendants have been scattered in small herds into several States, but, we regret to say, not with the popularity which such excellent grazing and beef-producing animals merit. As flesh-producers, they strongly rival the short horns, and, in size, nearly equal them. They are mainly red in color, with white, or mottled, faces, and occasionally white legs and bellies, and stripes along the back. In England, they are claimed as an ancient breed, and their distinctive, uniform appearance well bears out the assertion. The three English breeds already named may be classed as the best flesh-producers.

Next, in order, may be named the breeds more distinctly used for dairy purposes. The

AYRSHIRE.

This is claimed as a dairy or milking breed, and wherever known, either at their native homes, in Scotland, or in their later ones, in the

United States, are esteemed and cultivated for that exclusive purpose. They are said, by authentic history, to have been originated about a century ago, in the district of Ayrshire, whence the name was taken, by a cross of short horn bulls, from the north of England, on the common, or native Kyloe cow, of Scotland, and cultivated into their present excellent dairy qualities by careful and persistent breeding, until their characteristics have become fixed and enduring. They were first imported, in small numbers, to America, between the years 1820 and 1830, as nearly as can be ascertained, and, within the last thirty years, in such numbers as now to be found in many considerable herds. They are highly esteemed, by those who are partial to them, for their large yields of milk, which render them much more profitable for dairy uses than the common cows of the country. In size, they are about equal to our common cattle. In color, usually red or brown, more or less mixed with white. In shape, more like short horn than any others, although lacking their fine contour and comeliness of appearance. A valuable breed of cattle.

HOLSTIRNS, OR NORTH HOLLANDS.

This breed, in its present characteristic of great milk-producing quality, has been introduced here within the last twelve or fifteen years, from Holland, and first, we believe, imported by the late Mr. Chenery, of Boston, Massachusetts. They are of large size, nearly equal in weight and bulk to the short horn, and have some of their strong points of character, but coarser, less refined in figure, and black and white in color. For the few years in which they have been on trial here, their dairy development has been remarkable in the quantity of their milk. As a flesh producing beast, they are claimed to be good, but the economical result, in their consumption of food to weight of flesh, has not been thoroughly solved. They are unquestionably good cattle, far superior to our native cows, and when sufficient time has pased to develop their full qualities, they may stand in the first class of dairy cows. They are evidently of an ancient stock, originating, possibly, in Holstein, or North Holland, and may, in some branches of their ancestry, have had an affinity with the far-back, unimproved short horn, although in color, and general appearance, now much unlike our short horns of the present day.

Last, but not least in importance, may be named the

ALDERNEY, JERSEY, AND GUERNSEY,

from the Channel Islands of Britain, near the coast of France. These breeds, or varieties, are named together, as they are unquestionably of common origin, and owe their present distinctive qualities in appearance to their manner of breeding, and the tastes and preferences of their long-time propagators. That they are an ancient breed there can be no doubt, probably French in origin, as the cows of the provinces of Normandy and Brittany bear a considerable resemblance to them; but, isolated as they have been from the main-land of the continent, during the centuries of their cultivation on the islands, they have assumed the characteristics which so readily distinguish them. In size they are smaller than our native cows, delicate in form, unique in shape, diversified in color, and blood-like in appearance. The prime quality claimed for the cow is the exceeding yellow color and rich quality of her milk, cream, and butter, in all which she stands without a rival, although her quantity of milk is moderate, compared with the weight of butter which it yields. For the production of meat the Channel Island cow, or even bullock, (whenever suffered to become a bullock,) is inferior, the anatomy being angular, and not capable of making much flesh in the choicest parts of the carcass. Within the last thirty years they have been numerously imported into our States, and are much sought in the vicinities of our large cities, towns, and villages, as family cows. They are easily kept in small paddocks, or close stables, where their rather delicate natures can receive the attention, kind treatment, and choice food usually bestowed upon them.

For all these improved breeds, herd-books, containing their genealogy by way of pedigree, are kept in the United States, as well as in their native countries, and from them a full knowledge of their descent and blood is readily obtained by all who choose to inquire into their breeding. Prices might be quoted of the sales values of several of these breeds of cattle—some of them seemingly extravagant in amount—but such statistical reference is not demanded in this limited discourse, rather leaving it to the tastes, judgments, and fancies of those interested in their breeding.

The introduction of these improved breeds has added enormously to the value of the neat stock of our country, and their further dissemination is yet to add untold millions to its productive agriculture. Slow as farmers, cattle-breeders, graziers, and dairymen have proverbially been in the improvement of their herds, a rapid and more intelligent interest is every year manifested in their increase.

In addition to the breeds of cattle already named, may be a few others of foreign origin, introduced at different times, by way of experiment, or personal gratification; but, as they have taken no strong hold on the attention of our stock-breeders, a further notice of them may be omitted, while, in the grand specimens of the various breeds which have been mentioned, we may assert, without contradiction, that no country in the universe contains better herds than the United States of America can now exhibit.

The subject of our neat cattle can hardly be dismissed, without an allu soin to an important item of their increasing value, in *fresh beef exporta-*

tion, which has recently been developed by the demand for fresh carcass meat from abroad, particularly in Great Britain. Refrigerators have been fitted up in Atlantic steamships, and, by the aid of ice, many tons of beef, in quarters of the carcass, have already been, and unlimited tons more may continue to be, transported to Europe, with entire safety, and in perfect freshness. The prices for which it has been sold, in the London and Liverpool markets, have proved equal to those for the best qualities of their native beef, and profitable to the shippers. There is, however, a condition attached to our successful exports, which is, that the meat be of the best quality, and that quality can only be obtained from animals of improved breeds, which have been partially described.

We have only to proceed in the cultivation of those breeds, in order to add a wide, almost illimitable, field of production to the neat stock interests of our country.

SHEEP.

These were early introduced into our American colonies, as companions of the horses and cattle, brought by the settlers. They were of the kinds often common to England, Scotland, Ireland, and perhaps the western coast of the European continent, of various breeds, as they then locally prevailed, but without much merit, other than a tolerable carcass of ordinary flesh, and moderate fleece of coarse wool. They were so kept and propagated, with possibly an occasional importation of a better kind from England. but it was not until late in the last century that Bakewell, Ellman, and other enterprising breeders, made their experiments in different breeds, which resulted in any considerable improvement in their condition and appearance. Thus the American sheep were chiefly of an inferior character.

MERINO.

In the early years of the present century, the American ambassadors at the Courts of France, Spain, and Portugal, during the intense commotions of the Bonapartean wars, purchased and shipped to the United States, many hundreds of Spanish Merino sheep. They were of the fine-wooled varieties, named, as you will find, in our books on sheep husbandry. Their introduction here was hailed with great satisfaction, and, as our infant woolen manufactories were then just emerging into existence, great importance was given to their propagation, not only in their own purity of blood, but, as valuable crosses on our own common flock, in increasing and refining the qualities of their wool.

From those days forward to the present time, the cultivation of the better qualities of wool has been the study of numerous flock-masters, in the various parts of the United States, suitable to their rearing, and the sheep interest now presents an important branch of our agricultural production and wealth. The Spanish Merino has, evidently, been much improved in its American cultivation, not only through the crosses of more recent importation, by several of our enterprising Americans, from the royal flocks of France, Saxony, and Silesia, upon the earlier Merino ewes, but by our own flock-masters at home, so that at this day, no fine-wool sheep in the world excel, and few equal, the *American Merino* in the heavy products of their fleeces, or the size and stamina of their bodies. We might examine the statistics of their annual production, aggregating millions of dollars in value, did opportunity permit, but we may rest content with the general facts which have been stated, and the progress we have made in their cultivation, not only in the fine wool, but in other varieties.

The Coarser Wooled Mutton-Sheep, so successfully bred in England during the last seventy years, we have, for the past thirty years, adopted by frequent importations. They have been successfully propagated, in their own purity of blood, and, by their crosses on the common flocks, raised our inferior ones to a value hitherto unknown in their kind. We have, now, the Bakewell, or Leicester, the Cotswold, and Lincoln, all of the most valuable long-wool varieties. We have, also, the Southdown, the Shropshire, and Oxford Downs of the middle wools, abundant in fleece, massive in the quantity, and delicious in the excellence of their flesh, so that Americans may, within the next decade or two, become, as they have never yet become, a partially mutton-consuming people, and ship thousands of dressed carcasses to Britain, as is now done with our fresh beef.

SWINE.

In the category of other domestic animals, brought into our country with the early immigrants, came, also, this animal, indispensable for domestic consumption, constituting an important item in our exports abroad. From the earliest history, swine has been connected with the farm husbandry, as well as untamed rangers of forest, in which latter condition they even now exist in some of the uncultivated sections of the Eastern continent. To what degree of perfection, or even improvement, they were cultivated in ancient times, history gives us little or no account; but we do know, that for many years previous to the present century, and for some years since, the common swine of the United States were inferior in the quality of their flesh, ungainly in form, slow in arriving at maturity, and repulsive, in almost every phase of their character, as companions to other agricultural stock. Yet, in Eastern Asia, and in portions of Europe, perhaps, for a century or more past, considerable advances had been made in the improvement of their domestic swine, as, a few years after the revolutionary war, importations of improved animals of the kind were introduced into our country, and among them we have accounts that General Washington had some of them, which were sent over as a present to him, at Mount Vernon, from England. Early in the present century, also, the East India merchants, of Massachusetts and New York, imported some fine specimens from China and India, which were afterwards considerably crossed on the common stock of our Eastern States, and much improved them both in the qualities of their flesh and domestic habits. Still, until within the last fifty, or even forty years, the mass of our farmers throughout the country, and more particularly in the Western States, bred and reared swine of ordinary character, answering, to be sure, the main requirements of consumable flesh, but inferior, in its high condition, to that now found in our markets, either for foreign consumption or exportation.

The various foreign breeds, to which we are indebted for our present swine improvement, are too numerous to mention, and their history, in detail, though quite interesting, is too long to narrate, but the agricultural literature of our several States will fully inform all inquirers of their various progress and present status. As an evidence of the present interest in their production and improvement, an association of swine-breeders has recently been formed, whose headquarters are at Springfield, Illinois. They have issued a swine herd-book, for the Berkshire breed, after the style of the various cattle herd-books, in which their genealogy and high excellences are chronicled. Not that we would exalt this particular breed above others, perhaps equally meritorious, but to signalize the enterprise of our farmers, and the magnitude of the pork and lard producing interest of our country amounted to hundreds of millions of dollars annually. The swine of the United States now consume a great share of the product of the almost illimitable corn fields of our Western and upper Southern States, thus converting a great portion of that valuable grain into a portable commodity, which, without them, would be either a drug or an almost inconvertible staple of their agriculture. We may, in view of the progress we have made in swine cultivation and improvement, place the United States superior to that of any other country in the world.

POULTRY.

To descend to a smaller, yet quite indispensable, item of food consumption in our households, as well as ornamental accomplishments of domestic life, the varieties of our poultry may well and profitably be mentioned. They, too, (the turkey excepted,) came over with the early settlers of our American colonies, and have been intimate associates of our people ever since. They constitute an important part of the luxury of our tables, both in their flesh and eggs, the aggregate commercial value of which, were it accurately reckoned, amounts to millions of dollars annually. The poultry literature of our country is voluminous, both in books and various agricultural periodicals, to which those in search for information may readily refer. As a general remark, it may suffice to say that importation from foreign countries, of various breeds of them, have been frequent and of rare quality, both in the estimate of the economist who propagates them for profit, as well as the amateur, for the gratification of his tastes in their selection and exhibition. Poultry societies have become numerous throughout the land, and the annual exhibitions of their various specimens have been marvelous in excellence, beauty, and variety. The cultivation of the finer varieties has arrested the attention of men and women of taste, wealth, and refinement, to such an extent that the perfection of our poultry may even be classed among the fine arts of animated nature, and challenge competition with any portion of the universe.

Least and last of the domestic, creatures which engage our attention, may be named the small insect.

THE HONEY BEE.

Time, long before, and ever since the bee made its honey in the carcass of the dead lion, slain by Sampson, has noted this useful insect in its companionship with man, as well as in its wild habitations in the wilderness, where climate and vegetation favored its propagation. It furnishes us with the most luxuriant of sweets, in its honey, and an important commodity in its wax. The aggregate annual commercial value of our bee product, is probably hundreds of thousands of dollars, being difficult to determine, from the want of current statistics; yet all, who choose to investigate, may be assured of their importance. Of bee literature, we have public journals, devoted to their interests, many volumes of printed books, and divers essays in our agricultural periodicals; and, were I to relate the annals of my own personal companionship with them, for many years past, I should only tell you that, at the present day, they are both as untamed and uncivilized as when the great patriarch, Noah, let them out of his ark to forage, among the renewed plants and flowers, at the foot of Mount Ararat. They live, propagate, and subsist by instinct alone, and not all the invention, or ingenuity, of man has been able to improve their qualities, to change their habits, or invite them to a companionable docility. Even the importation of the superior Italian bee into our country, in late years, and crossing them on our common stock, has not, perceptibly, improved their habits. So, lovably as they may be in their sweets and wax, they are barbarians now, as ever, and equally at home in the hollow trunk of a tree, in the wildest forest, as in their hives, amid the flowers of the field, or the refinements of the most highly cultivated orchard and garden.

Now, gentlemen, in all this long dissertation, I have probably told you nothing new, and little which will prove instructive, or even worthy of publication, yet, we have seen that, from the rudest material at the beginning of our agricultural settlements, we have made decided progress in the breeding and cultivation of our domestic animals, and that chiefly within the last century. We find that much has thus far been accomplished, and, with the aids and lights now at our disposal, we trust a still more rapid and a more widely disseminated progress can be achieved in the future.

The present value of all our varieties of domestic live stock in the United States, and its territories, may be safely estimated at two thousand millions of dollars, and their annual product, of all kinds, at one thousand millions more. Full thirty per cent. has been added to the aggregate *per capita* value of our *graded* stock, by improvements in their breeding within the last fifty years, and at no increased cost of keeping, although those improved animals, as yet, extend over only a fractional part of our country. What, then, may be the increased measure of value, when—if such a thing be possible—that improvement shall embrace the farm stock of our entire broad nationality? It must be almost incalculable.

In review of this live stock history, and progress, which has been considered, I wish here to note, and with somewhat of emphasis, that, with the exception of our finer classes of horses, the breeding, rearing, and cultivation of our farm stock has been hitherto considered, by those not intimately acquainted with it, as an occupation of a rather vulgar order, and conducted by men of duller intellects than those engaged in professional, scientific, commercial, or manufacturing pursuits. Such a supposition is a profound and ignorant mistake, based only on an entire misapprehension of the study of animal physiology. The cultivation of domestic animals, and their improvement, through generations of their kind, into the admirable specimens which we now see, is as much a branch of fine arts, applied to animal prysiology, as are the superb specimens of statuary and paintings which you, to-day, witness in these centennial rooms, produced by the successors of Phidias, Michael Angelo, Raphael, or Claude Lorraine.

Among the improvers of domestic live stock, within the last two centuries, both in Europe and America, will be found men of the highest intellect, learning, refinement, position, and wealth, whose studies have been drawn to the development and exaltation of the quality of their animals. I need not recount of the distinguished Europeans, past and present, who have lent their influence and labors to that pursuit; nor to Americans, from George Washington, of Virginia; Chancellor Livingston, of New York; Henry Clay, the great Kentucky statesman, and a large number of eminent men, of all professions and pursuits, aside from the enterprising farmers, proper, whose main business has been that of breeding and rearing improved classes of stock, names, both dead and living, all too numerous to mention. Nor has the attention of those breeders and improvers been limited to the most valuable classes of stock, but equally so to those of minor commercial value. Women, too, of equal rank and position, in society, with men, both in Europe and America, may be classed in the noble array of fine stock improvers—all, in their labors, benefactors of mankind.

God has appointed our lot in a country of diversified climates, and blessed it with a wondrous fertility of soils. If a due improvement of our advantages be hereafter neglected, on those guilty of that neglect, will rest the penalty; and yet, when another Centennial of American Independence shall arrive, we trust that those who then succeed us may rejoice as we, their progenitors, now do, at the present, in a still higher advancement, to crown their labors with thanksgiving and gratitude to the benignant Father of mercies, for the successes they shall have achieved and enjoyed.

ARTIFICIAL FERTILIZERS.

A. B. Kiess, *Safe Harbor*, *Lancaster County.*

Under our modern system of farming, there are, on an average, probably more of the fertilizing elements of the soil removed than are replaced by manures made on the farm in raising stock, and from animals kept to work. Some of these elements, such as nitrogen and ammonia, are supplied in small quantities by the air and rain water. So, if all the grain, hay, and other produce were consumed on the farm, and the manure resulting therefrom applied to it again, its fertility would constantly increase. Some persons recommend this course, but as other things, besides butter, cheese, and meat, are needed by people of cities, and those who work at trades, a great deal of the other products must be sold off by some of the farmers. Through the aid of science, it has become known how much or what kind of materials are taken from the soil by any of the regular farm and garden crops, and, by the same aid, it has been discovered where to look for the materials so removed, and this has given rise to what are called "artificial fertilizers."

The principal materials removed, in cropping, are nitrogen, potash, soda, lime, magnesia, phosphoric acid, and sulphuric acid, but the different crops remove them in very different quantities. Thus, buckwheat straw, weight for weight, removes about four times as much nitrogen, potash, and soda from the soil as wheat straw. Tobacco (leaves) removes more nitrogen than any other crop, and over twice what the same weight of wheat would, and removes nearly six times the quantity of potash. This shows the reason why some crops are termed as "hard on the land."

From what we have observed above, a fertilizer should contain all the materials the plant needs in growing to a full development. Any fertilizer, having all these, is a complete fertilizer, and could be used year after year with good effect, but, unfortunately, the only reliable one is barn-yard manure, and of which we have seldom enough. A fertilizer that lacks some of these materials may, perhaps, have others in abundance, and would be suitable for particular crops, or for soils, out of which such materials had been taken by long continued and over-cropping, until it became "worn out," *i. e.*, lacked some particular material which was needful for growing full crops. These may be called special manures.

In the application of the complete manures, there is very little art to be employed, as the only trouble is that seldom enough of it is available, In the special manures, if the soil is already in fair order, with the materials in proper proportion, it is only necessary to know that materials are needed for the crop, and then apply that fertilizer which contains these in abundance.

On over-cropped fields, it is more difficult to tell what fertilizer is needed, for now the wants of the crop to be raised have to be taken into consideration.

To apply artificial fertilizers, the farmer should be conversant with the wants of the crop he raises, what the materials are, the amount removed. and where he can get them again at the lowest rates.

It must be remembered, however, that the fertilizer that can be purchased for the least money is seldom, if ever, as cheap as the higher grades at twice the price.

But the price itself is not always a sure rule, for in the *American Agriculturalist*, (April, 1876,) is given the analysis of five different fertilizers, of which two high-priced kinds were worth more, per ton, according to a certain standard, than the price asked. Another, quoted at $42 50 per ton, was worth about that sum, while another, quoted at $55, was worth only $8 27, and another quoted at $25, was worth only $9 64.

From this, it will be seen, that great care must be exercised in buying, and only well-known standard articles bought in large quantities.

If a new or unfamiliar brand is bought, it should, at first, be purchased in small quantities, and tested, and, even should it turn out well, the reputation of the parties manufacturing the articles should be established, as persons who have embarked in its manufacture as a permanent and *bona fide* business.

We will now endeavor to learn what the materials are that are taken up in plant growth, their functions, &c.

Nitrogen is an invisible gas, and constitutes 77 lbs. out of every 100 lbs of common air. It is seldom found in minerals, but is a very important element of animal and vegetable substances. It is found and forms an important part of lean flesh, white of eggs, curd of milk, gluten of grain vegetable of fibrine, &c.

If nitrogen could be easily manufactured from the air, where it is so abundant, there would be a good supply at low rates, but this is, unfortunately, not the case. It is found in fertilizers as ammonia, which is a compound of three equivalents of hydrogen, (also a gas,) and one of nitrogen. It is very volatile, *i. e.*, escapes readily into the air, unless fixed by changing it to sulphate of ammonia or some like compound.

The ammonia in animal manure and urine is readily fixed, by adding sulphuric acid, but as land plaster, (gypsum,) which is a compound of sulphuric acid and lime, is more easily obtained, not so dangerous to handle, and answers the same purpose, it is better to use than the latter.

It is for the purpose of fixing the ammonia, that the papers often recommend the application of plaster to the manure piles, but they seldom, if ever, give the reason for its application. It should be applied every time the stables are cleaned, or, perhaps, it would be better to scatter a small quantity every evening before bedding, having it handy in a box in the stable.

The powerful stench that arises in some horse stables, and causes the eyes to overflow, is ammonia escaping. As it is one of the costliest elements in all manures, especial pains should be taken to prevent its waste.

In fixing the price of Peruvian guano, it is calculated at 17½ cents per pound, which is equal to $350 per ton. In any fertilizer, where the quantity of ammonia is stated, it is easy to get the cost of the nitrogen, by multiplying the price of ammonia by 17, and dividing by 14, because ammonia is composed of 14 parts, by weight, of nitrogen, and 3 parts of hydrogen. In the case of Peruvian guano, therefore, the nitrogen would cost 17½X17, divided by 14=21¼ cents. If nitrogen only is wanted, it is best to buy nitrate of soda, which contains about 15 per cent. of nitrogen, and sells at 4 to 4½ cents per pound, and the nitrogen contained in it will cost 27 to 30 cents per pound. It is very soluble, and acts quickly. The quantity applied per acre is about 150 pounds, but, in the case of wheat, 100 pounds is recommended as a fall application, with another application in the spring.

The number of pounds of nitrogen removed per ton of the different crops, is as follows:

Wheat, 41½; wheat straw, 6½; rye, 35; rye straw, 5¾; oats, 38½; oats straw, 8; corn, 32; corn fodder, 9½; meadow hay, 28½; timothy hay, 36½; red clover hay, 42½; potatoes, 6½; tobacco, 92.

POTASH

Is a compound, composed of one equivalent each of potassium and oxygen, and is found, in very variable quantities, in different plants, or on the same plant, and I think that the same kind of plants vary with the locality where they are raised, for the analysis of different chemists vary, sometimes, as much as 25 per cent. or more as to the amount contained. Potash is seldom found in artificial fertilizers, and then only in small quantities. In Peruvian guano, it is valued at 7½ cents per pound. To apply potash to the soil, it is only necessary to give a good coating of wood ashes, but as these are difficult to get nowadays, recourse is had to what is called "German

Potash Salt"—but, if potash is present, as chloride (muriate) of potassium, according to Professor W. O. Atwater, in the *American Agriculturist*, they should not be used on tobacco, beets, and potatoes, as it injures the burning quality of the leaf of the first, and decreases the quantity of the sugar in beets, and of starch in potatoes. If present, as sulphate of potash, it will do no injury; the chloride is excellent for grains and grasses. I believe the nitrate of potash, (saltpeter,) is also sometimes used a fertilizer.

In the absence of all potash compounds in the soil, the seeds will germinate, but will not grow more than a few inches high, and this growth is most probably at the expense of plant food, stored up in the seed. The amount (in pounds) of potash removed per ton, of different crops, is as follows:

Wheat, 10½; wheat straw, 12½; rye, 11¼; rye straw, 15½; oats, 8¾; oats straw, 17¾; corn, 7½; corn fodder, 19¼; average meadow hay, 26½; timothy hay, 40¾; red clover hay, 36½; potatoes, 11½, (about one third pound to the bushel;) tobacco, 60½.

(The amount of materials removed by crops, and some other figures, are taken from tables furnished to the *American Agriculturist*, by Professor Atwater. They vary a little in some points, compared with other authors, but as they are of later researches than the works I have access to, they are published as given in the above paper.)

Phosphoric acid is found in all plants, and is next to nitrogen in price and difficulty in obtaining it. It is also found in bones, in combination with lime, as phosphate of lime. It is also found in guano and other good fertilizers. In these fertilizers, it is in three different states, known as soluble, reverted, and insoluble.

The reverted was at one time soluble, but has become insoluble; but, when mixed with the soil, is readily decomposed by other materials, so as to be soluble. The rate in fixing the price of Peruvian guano, is for soluble acid, 10 cents; insoluble, 2 cents, and reverted, 8 cents per pound.

The amount of phospohric acid removed, in pounds, per ton, of different crops, is as follows: Wheat, 15¾; wheat straw, 4½; rye, 16¾; rye straw, 4¼; oats, 6½; oats straw, 3¾; corn, 11¾; corn fodder, 10½; meadow hay, 8¼; timothy hay, 14½; clover hay, 11¼; potatoes, 3¼; tobacco, 9½.

In fertilizers, the number of pounds, per ton, is as follows: Peruvian guano, 260; (the agent of the Peruvian guano give it about 100 pounds more;) bone meal, 464; Baker guano, 696.

The above three materials (nitrogen, phosphoric acid, and potash) are the most costly and hardest to obtain.

The following are also necessary to plant growth, but are easily obtained:

Sulphuric acid is removed only in small quantities, and is the most easily and cheaply applied, in the form of land plaster, sulphuric acid, and lime.

As the acid is easily washed out by rains, it should be applied oftener than fertilizers usually are. The usual quantity is from 100 to 150 pounds per acre.

Lime is removed in greater quantities than sulphuric acid, but it is not applied, only on account of being one of the materials of which plants are framed, but it loosens clay soils, and seems to decompose, and make more acceptable the vegetable matter in the soil. It has been found injurious to but two crops. Oats will not ripen perfectly, after an application of it, and sometimes becomes rusty.

According to Johnston, flax is said to be injured in the fiber by it. So that, in Belgium, it is not grown until some years after its application There may be other crops which are sometimes injured by an over application. The amount applied varies from twenty-five to one hundred and fifty bushels per acre, but, on thin land, it is not safe to go much over fifty bushels per acre, and to stand one hundred and fifty bushels, the soil would have to be pretty well stocked in vegetable matter.

As it also is liable to be washed out by rains, the better plan is to apply less at a time than there usually is, and do it oftener, it being considered best to spread it on top, and not plow under, as it is soon enough below the reach of plants. Other elements are either supplied by the air, or so plenty in the soil, that it is not necessary to make any special mention of them.

Any farmer, intending to use artificial manure or fertilizers, should have at hand some standard work on agricultural chemistry, and on plant growth, so as to be able to judge what he wants. He should give little heed to what an agent or dealer in fertilizers may tell him, though I might not blame the agent for wilfully misstating facts; but it must be remembered, that the fertilizer may have done good in a certain case, yet in another it might not work, because it did not contain the materials which were needed, either by the soil or the crop. At any rate, it is advisable that only standard and well-known articles be bought in quantity.

WHEAT AND ITS CULTIVATION.

By George Geddes, *of New York.*

Wherever good wheat can be produced, the flour made from it will be the material most used for making bread. The more advanced in civilization any people may become, the more certain it is that they will use this material for bread; and thus it happens, that countries, whose soil and climate do not favor the production of wheat, if the inhabitants have sufficient wealth, will import largely their breadstuffs from more favored regions. There is no substitute for the wheaten loaf to him who has once become habituated to the enjoyment of it, and there is no grain, with the exception of rice, that is so extensively used as food for man. The almost universal demand for wheat flour, and the fact that but a small proportion of the earth is well adapted to its perfect production, renders it certain that choice wheat lands will continue in the future, as in the past, to be held as of great value. Communities that raise a surplus of wheat, beyond their own wants, will generally be found to be every way prosperous, refined, and cultivated just about in the degree that this grain is made their leading staple. It would be difficult to assign too high a value to first-rate wheat lands; and, in a national point of view, it is likely that the possession of great districts of country, that are well adapted to the production of wheat, will continue to produce a marked influence on the habits and prosperity of the people. Nations that eat bread made from wheat, will reach and maintain the highest plane of civilization. Anything that leads to the more economical production, and to the extension of the profitable culture of wheat, aids not only in promoting individual and national wealth, but is a blessing to the great mass of men, and especially to the poor. We want cheap wheat, that is produced at a profit. The object of what follows, is, if possible, to aid in bringing about this desirable end.

Winter Wheat.

The soils best adapted to the profitable cultivation of winter wheat, have a large proportion of clay and lime in their composition, with sufficient sand to prevent the formation of hard masses or lumps, during the process of cultivation in moist weather. Such a soil is usually called a "clayey loam," and the springs of water that flow from it will be so impregnated with lime, as to render it too hard to use for washing purposes. The trees that are usually produced spontaneously by such lands, will be mostly of the harder kinds of wood, the oak abounding. This description is not intended to be either scientific or minute, but to indicate the leading characteristics, with sufficient accuracy, to enable the mere traveler, as he passes along, to judge of the capacities of an unsettled country, so far as the soil alone can indicate. In settled districts, the practices of the farmers will be a certain test of the wheat producing powers of the land, for it is certain that where winter wheat may be said to be a natural crop, there it will be grown in preference to any other.

WINTER WHEAT REQUIRES A WELL-DRAINED SOIL.

Some lands are perfectly drained by nature; other lands, though they may have every constituent that the agricultural chemist may desire, will not raise wheat, without artificial draining, at great cost. The more clay abounds, the more elaborate must be this artificial draining. Sandy loams, with open, porous sub-soils, generally require but little artificial draining, and this is strikingly true when the land is but just cleared of the forest. While the roots of the trees are decaying, and making channels through the sub-soil, many farms are able to produce wheat in perfection, that refuse to do so after the land has been under cultivation many years, and these root-made channels have become obliterated. This I have seen over wide spread areas. When the land was new, it was dry enough; when plowed for many years, it had become so heavy, that, in wet times, it was nearly mortar, and, in dry times, hard, indurated, and filled with cracks. Thorough draining is, then, the only remedy, and if clay predominates, it is the certain remedy. Undrained clay lands are never worn out, for the owner, that lacks the energy to free them from stagnant water, never has force enough to exhaust their fertility by cropping. Manure on such land is nearly thrown away. Draining is the first thing to be done, next thorough cultivation, then manure. Whoever reverses this order, throws away his money and his labor. There are some limited districts of country, where the soil has been formed from disintegrated shale, or soft rock, that was so constituted that it has given sufficient consistency to make good wheat land. The sub-soil, or rather the underlying rock, being full of cracks and seams, allows all surplus water to escape, thus perfectly draining every square foot. The owner of such land is fortunate, if the rock is only made of the right materials. There is but little of this peculiarly formed land. Most lands that are usually called "clayey loams," are due to an entirely different process of nature. The clay was deposited in water in thin layers, divided by lamina of sand. Water passes very slowly down through such a soil, though it will drain horizontally very rapidly, finding its way along the thin layers of sand. In such a soil, tile draining is at once very effective.

There are clays in which the silicious matter is not in layers, but distributed through the whole mass of clay. These lands are very difficult to drain, and require drains to be very close together to make them suitable to raise wheat.

In the selection of farms, it is very common to prefer the sandy loams, because of their being more easy of cultivation, and more free from stagnant water, but, if the object is to raise winter wheat, it will be found, in the end, that the more clayey soils are the most valuable, from the fact that they are more enduring, and make better returns for the manure that is put on them.

Either extreme, too much sand, or too much clay, should be avoided in selecting a wheat farm. The experienced farmer will find no difficulty in knowing when he has found just the true mean; the unskilled may derive some benefit from the hints I have given.

While clayey loams are best adapted to the profitable production of winter wheat, it is well to remark that there are other soils, such as gravels, sands, and the like, on which crops of wheat are constantly grown. By using hardy varieties of wheat, I have raised fair crops on alluvium, once a perfect swamp, that had been deposited by the freshets of a brook, but the water of this brook has much lime in it, and the alluvium, in some places, approaches, and is, in fact, an earthy marl. On all the inferior wheat lands, the crop is subject to disease, and to great injury from the depredations of insects, not having the power to outgrow, and overcome these enemies. High manuring and perfect cultivation are absolutely necessary to secure average crops on these lands, and so forced must be the farming that, even in new countries, the owners of such lands very soon find that they can put them to more profitable uses. Spring wheat will be raised for a while, perhaps, but, finally, the whole country will be devoted to dairy, or other purposes; that compensate the cultivators of the lands much better than the returns from wheat. Thus the aggregate production of wheat is constantly falling off, in all the older States. New lands are brought into cultivation, as population extends west, and the first effort of their owners is to raise wheat, and they continue its production, in many cases, long after it has ceased to be a remunerating crop, for wheat raisers are always reluctant to give up the contest.

The true wheat lands are such as will continue, for ages, to raise good crops, when properly cultivated and managed. The proportion that such land bears to the whole area of our country, is much smaller than is generally supposed. The Honorable Theodore C. Peters, in his very able report, as one of the State assessors of New York, published in the transactions of the New York State Agricultural Society, for the year 1863, estimates the area of the wheat lands to be only thirteen per cent. of the whole State, while he assigns to the dairy thirty-five per cent. Of this thirteen per cent. of wheat land, he says that forty-one acres, in every one hundred of improved land, is devoted to pastures and meadows; and, from his figures, it appears that, of the 2,600,209 acres of improved land adapted to the raising of wheat, only 407,019 actually raised wheat in the year 1860. These figures of Mr. Peters show how limited is the area of the true wheat lands in the Empire State, and they should teach their owners something of their great value.

CULTIVATION OF LAND FOR WINTER WHEAT.

Imagining ourselves to be placed in a good climate, and on good wheat soil, that is free from all stagnant water, and free from all stumps, stones, or other obstructions, to perfect cultivation, we inquire as to what is the first thing to be done to raise a good crop.

Of all the cereals, wheat demands that the soil should be pulverized in the most perfect manner, and, if the soil is naturally stiff and hard, it must be broken to a considerable depth, that the roots may readily penetrate the sub-soil. This is the object and end aimed at, in all the plowing and harrowing that goes before sowing the seed. The cheapest way of doing the work is the best, provided it is really done. When the country was new, and the land had been but little cultivated, this was a laborious process, and generally required several plowings and harrowings. Judicious treatment of clayey lands, while raising grass or grain crops in the rotation, will make the process of fitting it for wheat laborious and expensive. It is usual to put Indian corn on a clover sod, as the first crop in rotation, and some unwise farmers allow their cattle to run on the corn stubble in the fall, and poach up the clay while wet, turning it into what the engineers call "puddle." No practice deserves more censure than this. The next spring, when clayey land, that has thus been mismanaged, is plowed, it will turn up in hard lumps, that can only be broken up at a great cost—and, also, it will take much more power to draw the plow, than it would if no cattle had been allowed on the land the fall before. If the land abounds in sand, all this is changed. Sandy land generally requires compression, and the feet of cattle and sheep are often judiciously employed for this purpose.

CLAYEY LAND MUST NOT BE PLOWED WHEN TOO WET,

I mean when there is stagnant water in it. All good soils are composed of minute particles, that will hold a certain quantity of water, which is necessary to all crops. Excess of water is known as such as these particles can only hold by its being confined, and that would drain away, if allowed to do so. Immediately after a heavy rain, all soils are saturated with this redundant water, and, at such times, the wise farmer will neither cultivate his land, nor allow heavy animals to trample upon it. The more perfect the drainage of the land, the sooner this excess of water will pass away; and then comes the time when the skillful man will till his land. If clayey land is allowed to become too dry, it is not only hard to plow, but the work cannot be so well done, as it can at the time that the land is just in the right condition as to moisture. Practical skill alone can decide as to the best time, all things considered, to cultivate, so as to have labor expended in the most judicious manner.

Now, assuming that we have land that has been well managed, one flowing will completely pulverize it, if this flowing is done at the right time and in the most skillful manner. Narrow furrows, made by plows just adapted in the shape of their mold-boards to the land, are necessary. Complete disintegration of the particles is effected by just moving them on each other, and it is not necessary to lift the furrow slice high up, or move it far, to do this; the least breaking of the cohesion is sufficient. The harrow follows to level the surface, and more perfectly prepare the seed bed.

It may, and often will happen, that by reason of wet weather or bad management, there will, in clay soils, be some small lumps after the plowing and harrowing has been done. In such a case, the roller or clod-crusher must be used to reduce these lumps to powder

In some open winters, the land will, for many weeks, be frozen hard and exposed to the winds, uncovered by snows. In such cases, gales will drive the dust, made of the frozen earth, sometimes to great distances. If the young wheat plants, growing from the bottom of the trenches, made by the drill-spouts, have a ridge to the windward of them, they will be planted deeper by these gales; while, if the ground were left level, the plants on ridges and the more exposed places would have all the earth blown away from them, and their roots exposed and killed by the unpropitious season. The drill is a most important farm implement to the raiser of winter wheat, planting all the seed to a uniform depth, and raising a barrier to protect feeble plants from winter killing. But these barriers must be left until the trying period has passed in the spring, then the roller should be used for the double purpose of leveling the ground, so that the reaper will move smoothly over it in time of harvest, and for the further object of breaking and crushing the surface soil, after the rains and frosts of early spring are passed. This rolling, if done at the right time, is of great value to the young wheat, and assists materially in covering the clover seed, but it must not be done until after the clover seed has been sown.

In sections of country that are subject to open winters, it is advisable to run the drill at right angles to the direction of the prevailing winds. I have observed this in my own farming with advantage, and, in cases where it was was necessary to cross the line of the winds, I have drilled the field diagonally.

Naked Summer-Fallowing.

When the country was new, the land abounding in the stumps of forest trees, and more or less loose stones, made the perfect plowing of land impossible. Summer fallows, as has been intimated, were necessary for the successful production of wheat. Really, three plowings in those days did not cultivate the land, as perfectly as one does, now that all these obstructions are away. To work among the stumps, we necessarily used plows that were short and sharp in the twist of the mold-board. Now, our plows enter the ground at a more acute angle, run deep, and not only reverse every part of the furrow-slice, but they crack and pulverize the whole mass. Not a balk is left by a good plowman, and every part of the soil is worked in the most perfect manner. This being so, why waste the season in the useless labor of repeated plowings and harrowings? The only answer that can be made is, our fathers did so, and taught us to do so.

To state this a little more fully: Let us suppose that we have a clover field that we intend to sow with wheat. One way of doing the work, will be to plow under the sod soon after the corn planting, say early in June, harrow the ground down level and smooth. There let it rest until after harvest, and then, in August, plow again and harrow, as before. About the 1st day of September, plow the third time, harrow and sow the wheat. Thus we have the old-fashioned, naked fallow, and have not only done much hard work, and lost all use of the land from the 1st of June, but we have exposed the soil, by repeated working, to the air and sun, and killed all the grass, and most of the weeds that were in it. This killing of foul stuff is the gain we have made, and in cases where the land is very foul, this great labor may not only be justified, but may be well laid out, as the only means of getting rid of certain noxious weeds; but this is the only justification for a summer fallow of this kind, where there are no obstructions in the way of thorough plowing. Let us compare this with another way of treating the land.

Plow early in the spring, if the land was not plowed the fall before; sow barley or oats on it. Harvest the crop; glean up with a steel-toothed rake—hung on wheels, drawn by a horse, and rode by the owner—all the straw, leaving as little of the barley, or oats, as possible on the land. Plow at once, if the land is foul, and harrow well; this will cause all the grain that shelled to grow, and, also, start the weeds. From the time the spring crop of barley, or oats, is harvested to the time to sow wheat, five or six weeks will elapse, of the best weather of the whole season, to exterminate foul stuff. If this time is well employed, and the season is dry and warm, much may be done by two plowings, and as many harrowings, to make the land clean for the wheat.

QUANTITY OF SEED REQUIRED FOR AN ACRE.

This depends somewhat on the variety, and the time and manner of sowing. The tendency among wheat raisers has, of late years, been to the use of less seed than formerly. This is, perhaps, in part due to the general use of the drill. Thirty years ago few farmers here sowed less than two bushels to the acre, but it was sown by hand broadcast, and then harrowed—some of the seed would get so deep that it did not come up—some lay on the surface, and was food for the birds. The introduction of the drill enabled us to put all our seed at the desired depth, and thus secure the growth of every grain, and now few farmers here use more than a bushel and a half to the acre. Mr. John Johnston, who is an acknowledged authority among us, told me last summer that one bushel and a half of Deihl wheat was as much as should be sown on an acre. Too heavy seeding is not only a loss of the grain, but it causes the crop to fall, and thus lead to a more serious loss, and to extra expense in harvesting. Wheat that has a large berry, will have less in number, in a given quantity, by measure, than the smaller varieties, and, of course, more by measure will be required. The general tendency, is, however, not only here but in England, to lighter seeding, and many experiments, made in both countries, go to show that half a bushel, or even less of seed, would be sufficient to furnish all the plants necessary for an acre, could we rely on preserving every plant alive through the winter and spring. For Mediterranean wheat, a bushel and a half is generally sown; for Treadwell and Weeks, being smaller in the berry, a little less is admissible, when sown early, and on ground in first-rate condition.

TIME OF SOWING.

Like many other matters in managing a farm, this is a point in regard to which no positive directions can be given; only general suggestions and advice are admissible.

The leading objects is, to have the young wheat strong in the root, without too much top, before snow comes, or the ground freezes up in the beginning of winter. Most experienced wheat growers would, probably, say that they had lost more by sowing too early than by sowing too late. In this latitude (43°) my opinion favors the ten days, from the 15th to the 25th of September, in ordinary seasons. Wheat sown from the 1st to the 10th of September, has generally grown too much top to winter well—with me—and the Hessian fly is very apt to make his lodgment in early-sown wheat. If the sowing is deferred until the frosts may be expected to destroy the fly before the plants are sufficiently grown to take possession, and the land is in high condition, we usually avoid the fly, and secure sufficient fall growth by sowing about the 20th of September. The objection to large growth, in the fall, is the liability of having the wheat smothered under deep snows, that sometimes remain on the ground for three months or more. Unless the ground is frozen hard before the snow falls, heavy drifts will winter-kill wheat that has a large top.

HARVESTING WHEAT.

Much has been said in favor of cutting wheat early, while hardly out of the milk. This is bad advice, for many reasons. The farmer gets less wheat than he does if he delays cutting until the berry is too hard to flatten under the pressure of the fingers. The time required to cure unripe wheat is so great, that there is great danger of rains wetting it more than once before it is ready to be put into the barn. Less labor will be required to harvest and secure a crop of wheat, by allowing it to stand as long as possible, without having the grain waste by shelling in the handling. Farmers that raise large crops will necessarily cut some of it as early as it will do, and then, perhaps, not be done with harvest before something will be lost by shelling. That part of the crop that is just ripe enough to be drawn the same day it is cut, will go into the barn with the least cost.

It is curious to see farmers, living side by side, adopt entirely different practices as regards the conduct of a harvest. One will go on and cut his whole crop before he draws any to the barn, then draw it all in at one job, if he can; his neighbor will secure his crop in the barn, as fast as it is fit to be housed, and will stop cutting, if necessary, to do this, preferring that his grain should be wet by showers while standing than in the bundles. Wheat in the sheaf, once fairly drenched with rain, requires three days of good weather to fit it for the barn. The danger of wheat sprouting is always to be kept in mind; and though, in very good weather, a crop of wheat will be best harvested by cutting the whole crop, and then securing it, it is safer to adopt the plan of drawing as fast as ready. Our own unvarying rule is, secure the crop at the earliest moment.

IMPROVEMENT OF SEED.

It is not necessary for me to dwell on the importance of raising no foul stuff with wheat. I am no believer in the turning of wheat into chess, or anything else; but I am a believer in clean land, and entirely clean and sound seed, and thorough cultivation; and I believe that our wheat crops might be greatly improved in quality, and increased in quantity, by careful selection of seed. Let a farmer first determine the best variety for him to raise. At or before the time of threshing, set some sheaves on a floor, heads upwards, and then draw out the most perfect heads—those of the greatest length and the best filled—until he has enough to sow an acre. Put this selected seed on land in the best condition in every respect; weed the wheat the next spring. This acre should give him thirty or more bushels of seed for the next year. Out of this grain draw the best heads, and sow an acre; and so go on for several years—the longer the better—and, by and by, he will have some seed wheat to sell that he may be willing to have bear his name, and he will be a public benefactor.

The perils from disease and insects, to which wheat is especially subject, will be discussed in another article.

THE CONTAGIOUS DISEASES OF ANIMALS.

BY A VETERINARY SURGEON.

This question, one of the most important and least studied by those whose especial duty it seems, and also, one that, in this land of plenty, ever occurs, seems to be a proper and fruitful theme. As we are particularly struck with the reference made to the increasing demand for animal food, and the means which were being devised to import the flesh of animals from distant countries, where cattle, and other food producing creatures, are abundant and cheap. But, while much interested in the attempts that were made to accomplish this most important object, I could not help thinking, at the same time, that we were far too little concerned about the home produce, and that we were not exerting ourselves, as we ought, to increase, and to consequently cheapen our own food productions. Neither do we appear to be at all alive to the terrible loss annually sustained in this country, from the ravages of transmissible or "contagious," but preventible diseases, among animals which furnish us with food, or yield us essential services as beasts of burden. And neither do we anxiously consider, as we should, the heavy embarrassment to cattle traffic, nor the danger to health, which some of these "catching" maladies inflict upon us—losses, embarrassments, and dangers, which are yearly on the increase, and to which we calmly submit, as if we were fatalists, or lived in the dark ages, when medical or sanitary science did not exist, and, again, when looking to the other regions for increased supplies—regions which can now furnish them, because their human population is, as yet, too sparse to require them for their own sustenance—we are apt to overlook the fact, that some day, this source may fail us, either because the supplies may be required upon the spot where they are created, or the very diseases which now diminish our own contribution, may abolish this source when they are introduced into these, as yet, uncontaminated countries. These reflections, which did not arise, for the first time, in November last, but have been impelling me for many years to an earnest study of this subject, in all its bearings, made me resolve to request permission to introduce this paper before your excellent Society, with a view to draw public attention to the serious issue involved in its consideration, and, if possible, to assist in indicating the most appropriate and efficient measures to limit, or altogether suppress, the scourges of animals we designate "contagious diseases." For though, in some of its features, it may be deemed an essential medical, or sanitary question, yet, on the other hand, it is, on the whole, one of vast public interest and pressing urgency, and one with which the aims of your Society are closely allied. For the art of preserving human life from the operation of influences connected with the arts whose developments you encourage, you have already praiseworthily recognized on many occasions, but on none, perhaps, so strikingly in that intensely engrossing series of lectures now being delivered by one of the greatest medical philosophers of our age, Doctor Benjamin Richardson. The preservation of human life, from accidents of all kinds, also, largely engaged your attention; and to prove that your good intentions are not limited to our own species, I may refer to the honorable distinction you conferred upon me last year, for a paper, which had for its object the preservation of the horse, in so far as the art of farriery is concerned. Besides all this, medical, or sanitary science, has pointed out, that, in order to come at diseases, and especially those of a spreading kind, a most complete and efficient organization is absolutely necessary. For the invasion of contagious maladies, is like that of a most wily and subtle human foe—powerful, only in his subtlety, and capacity to elude observation until he makes the attack. Not only this, but every step gained by him forms a new basis, from which an advance may be made in all directions.

Therefore, knowing this, we require a correspondingly perfect and skilled organization to cope with him; and we may also have to control the districts he invades, even though they be our own. Here, then, the art of organization comes into play, and this is an art in which, and particularly in regard to thesanitary organization, we, as yet, do not shine, because, I suppose, your Society has not included it among the arts it fosters and patronises. Let us hope you may recognize it as one well worthy of your solicitude and advancement. The daily increasing value of many of the domesticated animals, due to the greater demand for them as nations increase in numbers and civilization, and the greater necessity for perfecting and preserving them, have been apparent for many years.

Animal food has become more and more requisite for the busy physical or mental toiler, and animals have become more and more necessary as motor machines, notwithstanding the large number of non-vital machines invented by man to supplement or supplant them. Anything, therefore, which diminishes our flesh supply, or hampers it, or reduces the services we require from these animals, is a matter of great moment in the conditions under which we now live. And when, besides this, we are at the same time exposed to serious, it may be fatal, maladies, through consuming their flesh or products, or coming in contact with them, then is the question greatly increased in importance. I need not dwell at any length on the medical aspect of the subject, though I hail with delight a growing desire on the part of the masses to learn more pertaining to vitality—to life, health, and disease. It may, therefore, be sufficient, if in relation to what I am about to say, it is stated that transmissible maladies may only be so in respect to the same species—that is, from horse to horse, from cow to cow, &c., or to one or two allied species, or from one to every, or nearly every species. We have well marked instances of these. Again, a "catching" disease may be so intensely virulent that the slightest contact of a healthy with a sick animal, or even a few minutes stay some distance from it, or near anything which has touched it, or has been in its vicinity, will produce infection in almost every animal so exposed, or it also may be so slightly transmissible that prolonged contact, or even inoculation with some of the fluids containing the virus, is necessary to produce the disease in only a certain number.

In this respect, every contagious disease has its special characters, its own individual potency and diffusibility. Some of these communicable disorders again are extremely fatal, and kill almost every creature they attack, while others only produce a slight and transient derangement of health. In this respect, however, they vary, malignant diseases being sometimes less deadly, and benignant ones occasionally very destructive. The " catching " quality of a disease depends upon the presence of certain exceedingly minute living particles or germs, at least, for convenience sake, we will suppose it does. These are possessed of immense reproductive power, and more or less tenacity of life. Some of these specific germs possess the facility of reproducing to such an extent that a very few of them introduced into an animal's body adapted for their reception will, in a short time, have become so multiplied, that the whole of the tissues and fluids—it may be of an elephant—are impregnated with them. We had, also, diseases due to animals more or less minute, which take up their abode in different parts of the body, and give rise to particular disorders, and, which again, if they obtain access to another animal, when this eats the flesh or any of the products of the one they infested, may give rise to great inconvenience, or a more serious form of disease. We have, likewise, transmissible diseases due to vegetable growth in the interior or on the surface of the body. Some of these contagious diseases may affect the entire mass of an animal, and the poison exist in the flesh, secretions, breath, &c., or only certain organs, tissues, or fluids may be involved. The poison, germs, parasites, or whatever the agents may be upon which the disease depends for its maintenance or multiplication, may gain access to a healthy body through the breathing apparatus, stomach, skin, a wound, &c., and before its effects are manifest, a certain period, in some diseases pretty well defined, in others not so, generally elapses. The disease may or may not be communicable during the latent period. Some of these diseases are, in the present state of our knowledge, incurable ; all are more or less prejudicial to the animals they affect, either by killing them outright, or, when incurable, depreciating them in value, permanently or temporarily, diminishing more or less their products or their services, or rendering their flesh or products of less value, or even dangerous as food for man and other creatures. Though certain diseases are transmissible from man to animals, yet a far greater number are communicable from these to man, and some of these are extremely fatal when so transmitted. Some of these diseases of animals are indigenous to the country, and may be developed ' spontaneously," through unsanitary or other influences, while others of these maladies are "exotic" or foreign to our soil, and are, or have been, introduced from countries where they are more or less prevalent. These exotic diseases are by far the most serious, and have proved a most terrible scourge to this country ; they cannot be developed here by any combination of circumstances or conditions, but depend solely for their maintenance on their contagious properties. A knowledge of this undeniable fact is of great moment, in connection with their suppression ; for badly informed people, who fancy these can be "generated" in different ways in this country, would also have us believe that it is useless trying to suppress them like other contagious diseases. This was the painful erroneous notion which also prevailed when the cattle plague was introduced twelve years ago, and the injury the silly idea wrought, we can all remember ; we can also recollect how it was proven to be utterly destitute of a shadow of probability by the manner in which the plague was eventually stamped out. The same ignorance yet prevailed with regard to the exotic diseases, from which we now suffer, and the baseless notions are working as much harm every year as they then did. The people who entertain such fancies, when they are not moved by interested motives, cannot know anything of the history or the nature of such maladies. It is only quite recently that these foreign contagions have been introduced among our more valuable animals.

On the continent of Europe, the events of war, but more especially the greatly extended intercourse brought about by railways and steamboats, have been carrying these diseases from their birthplace, and gradually diffusing them all over the world. For the most serious of them have a wonderful power of adaptation, and they can maintain themselves in a great range of climate, and under extremely variable and diverse circumstances. The most formidable and barrassing of exotic contagions of animals, of which we have as yet had any experience, are three in number: The rinderpest, or "cattle plague," and what are commonly known as the "lung plague," and "foot and mouth" disease. The rinderpest has made only one great invasion of this country during the present century, and then, through the most unpardonable ignorance and supineness, it wrought an amount of destruction and ruin which is absolutely appalling, when we consider the short time it was allowed to revel, unchecked, among our herds and flocks. The sheep is affected with some serious contagious maladies, but chiefly with a parasitic disease of the skin, that occasions much loss. It may be said that thousands of pigs die every year from contagious diseases, which are not recognized by authorities, and we do not know the extent of the loss they occasion, nor even the nature of the diseases. Rabid dogs cause much destruction to property, and numbers of people die every year from hydrophobia, yet rabies is a terrible disease, not mentioned in any of the official records of the privy council. In fact, we are altogether uninformed as to the injury inflicted on the national wealth by many maladies which are very serious and alarming, and are yet preventable. With regard to the influence of the contagious diseases of animals upon the health of the nation, I am very sorry I can say but very little indeed. The sanitary science of man is only in its infancy, while the sanitary science of animals scarcely exists, and until these two important branches of medicine have attained a greater development than they can at the present boast of, we shall not be in a position to estimate the amount of injury to health we suffer from in our dealings or our contact, (external or internal,) with animals.

The money loss from the more prevalent and serious of the diseases which attack cattle, sheep, and pigs, must, to a certain extent, affect the public health, and especially that of the poorer classes, as it has a tendency to heighten the price of food, and to place that of a good quality beyond their reach. What is originally an individual loss—a loss to the breeder or feeder of animals—becomes, in this way, a public loss, which increases as it extends outwards, from the cow shed or pasture, to the lowly, in the close, foul alley, because it makes a pretext for higher prices, that the occasion really requires. But the poorer classes suffer still more, perhaps, from the low-priced flesh of unhealthy animals, which they are compelled to buy. There cannot be the least hesitation in asserting that a regular traffic, in diseased animals, is carried out on a large scale, in town and country, and if the flesh from them is not absolutely hurtful, it is, at the very least, less nutritious than that of healthy, properly conditioned animals. But there is every reason to fear that much of this flesh must be credited with increasing the bills of mortality, to an extent that we cannot, at the present, imagine. It is only now and again, and by mere chance, as it were, that instances of the traffic that we have mentioned, are lighted upon, and that we hear of the poisonous flesh of animals, which have died, or been killed, in consequence of a fatal malady, being seized by an inspector. It is still more rare to hear of poor people actually suffering from consuming this kind of flesh, yet, comparatively speaking, very few cattle, sheep, or pigs, which die from, or are slaughtered for, disease, find their way to the knacker, or are buried. It is, we fear, not at all unusual to kill and dispose of flesh of these creatures after they have been medically treated, and made to swallow drugs, which will act as poisons on those persons who are so fortunate as to consume this flesh; and, when the animals are seized with a fatal malady, it is the custom to call in the butcher to kill them, and dress their carcasses for the market. The flesh of the ox, sheep, pig, and goat may be injurious—nay, absolutely poisonous from disease, or it may be most pernicious, from presence of parasites, which will infect the body of persons who consume it. Recent researches have shown, in the clearest manner, that scrofula, or tuberculosis—a contagious disease—is very common in cattle, and especially in dairy cows, and that not only will the flesh of these produce consumption in other animals fed upon it, and particularly young animals, but that their milk will also infect. We dare not experiment on human beings to ascertain whether such a terrible result is possible with them; but, judging from analogy, we cannot venture to doubt it.

The flesh and milk of scrofulous cattle enter regularly into the diet of, probably, thousands of people, every year. That contamination may take place from the milk is, perhaps, the most serious reflection, as this is rarely boiled; for it has been proved that a high temperature will destroy the infective property, and hence the flesh, if thoroughly cooked, may be rendered inert. When we remember that milk is the staple diet of young children, and that infantile diarrhœa and glandular affections of a scrofulous nature, annually carry off large numbers, while phthisis, in young people and adults, is a wide spread and fatal malady, we are brought face to face with the serious question as to the share the flesh and milk of diseased cattle may have in the production of this mortality. Not only this, but some other disease or local conditions infect the milk, so much used as an article of diet. Evidence in abundance goes to prove that in "foot and mouth" diseases, the milk is positively injurious. It will kill young animals, and it affects children, and even adults, who partake of it. There cannot be a doubt that the manner in which cows are kept has a great influence, not only on their own health, but also on that of those who consume their produce. Unsanitary conditions may render such secretions as the milk very hurtful, and poisons may even be conveyed through the medium of that fluid, without the animals themselves exhibiting much, if any, disturbance. We are only on the threshold of our inquiries into these alarming, but, nevertheless, necessary to be recognized, facts, in sanitary science.

We have now to consider what, under the circumstances, we require to protect the wealth and preserve the health of the country, in so far as the contagious diseases of animals are concerned. The prime essential of such a protection, is a sanitary organization that will meet both requirements. At the present, this does not exist, and has never existed in this country, and yet in no part of the world has the necessity for it been more evident or more urgent during very many years. Though two of the destructive diseases we have more particularly alluded to, and which are now always with us, invaded the country some thirty-five years ago, I cannot discover that any steps were taken, up to 1865, to check their ravages, limit their extension, or properly ascertain their nature and mode of diffusion. Had sanitary science, or medicine of the lower animals, been what it might and should have been, in 1839, the country would have been spared the invasion of these diseases, as they were well known on the continent, and had been recognized as serious contagions years before they were introduced to us. Our position should have insured our exemption from them, had veterinary science been on a proper footing, and competent to afford advice as to the measures necessary for their exclusion from our shores, or extinction when they did appear. As it was, they were not recognized, and were permitted to spread with all the rapidity and virulence that marks the course of newly introduced contagions of this description. Up to 1865, the two diseases were allowed to exist, and to be carried about, evidently without let or hindrance. In that year, however, the introduction of the cattle plague caused a great panic, which, in 1866, led to suppressive measures being adopted for the extinction of that malady, and these measures, also, had the effect of pretty well extinguishing the "foot and mouth" disease and "lung plague." The sharp lesson taught by the "cattle plague," directed the attention to the damage wrought by other diseases, which began to prevail again, as soon as the restrictions were removed, and fresh importations of contagion allowed.

For various reasons, which are not far to seek, however, neither the prevalence nor the virulence of contagious diseases, appear to have been modified to any appreciable extent; indeed, since 1866, the country has been more severely scourged than before that year. The attempts made to limit the destruction of these diseases, have failed, simply because it was impossible they could succeed, while the endeavor to carry them out has been attended with serious inconvenience to the country, and heavy expense. Any one possessing the slightest acquaintance with these contagious diseases, of sanitary science, of the traffic in animals, and of the character of many of those who own and deal in these, (for conscientious cruples appear to have been abolished, when such maladies prevail,) could have foretold that the attempts would not only have been utterly futile, but that they would also prove onerous and unsatisfactory in every way. In the first place, those most concerned were not informed as to the nature and more important features of the disease to be combated. In the next place, carrying out of the measures were left to the local authorities, who, perhaps, energetic in the extreme, in one country, may have been as supine and negligent in another; and, thirdly, there was very few competent men employed to carry out the necessary sanitary operations. The latter was perhaps, the most serious omission, for instead of the authorities intrusting such important duties as the tracing and controlling outbreaks of disease, and guarding against its extension by every means which science and intelligence can alone suggest, this was left, chiefly, to the policemen, who, when in doubt as to the nature of a malady an animal was suffering from, called in a veterihary surgeon, or "cow leech," (for qualifications are not essential,) merely to settle that point. The members of the veterinary profession must, as a body, disclaim all responsibility for the enormous losses the country has sustained for so many years. Indeed, if they could lift up their voice, they would complain bitterly of the neglect with which their science and their services have been treated by the country during all this time of national loss and embarrassment.

Veterinary science has been allowed to struggle into existence, or perish in the attempt to maintain itself, as if it was of no value or consideration, and in 1865 and 1866, during the reign of the cattle plague, its graduates were exposed to the grossest abuse and indignity to which a profession has ever had to submit in any land, merely because they spoke truthfully, and declining to pander to the mistaken notions of those who ought to have known better, they pointed out the real nature of the malady, and yet they had at last to be called in to extinguish that pestilence, when physicians, amateurs, empirics, policemen, and local authorities had failed to cure or check its spread. No sooner had they done so, than they were once more placed in the back ground, where they will remain, in all probability, until the same heterogenous forces have broken down in their futile endeavors to rid the country of the scourges which now afflict it. It only remains to say, that the measures now in force, and the machinery at work in carrying them into operation, will never affect the object with which, we presume, they were devised—the suppression of contagious diseases, until an effective veterinary organization is established, in which well-trained veterinarians, under government direction, and independent of local influences, shall play the chief part, and be held responsible for the sanitary condition of their districts; advancing the local authorities on important questions, watching the movements of the cattle, keeping a careful eye on the fairs and markets, superintending, personally, the more essential operations needed for the extinction of a contagion, when it suddenly manifests itself, and directing the police while carrying out instructions in sanitary affairs, instead of being directed by these functionaries. Until this is done, which is not now done, we shall never rid ourselves of these scourges, nor save ourselves from loss and embarrassment. On the contrary, we may expect to see them yearly on the increase, and have perpetually exemplified the painful results of a "penny-wise and pound-foolish" policy. It is a grave mistake to suppose that the exclusion of foreign animals alone would rid the country of its contagious maladies. Foreign countries suffer less from them than we do, as these diseases are not so prevalent in them, and more energetically dealt with. It is a grave mistake to omit any part of the country from operation of laws which may be deemed necessary for the suppression of contagious diseases, and especially if that part is much infected. Such an omission must not only be fatal to success, but will prove a serious hardship to other parts, where the measures are attempted to be rigidly carried out. Information as to the prevalence of disease among animals, is urgently required, and this could be obtained by the organization I have described, and would be found much more exact, interesting, valuable, and reliable than that procured by uneducated policemen. While extinguishing contagious diseases within our own shores, care must be exercised that they are not introduced from without. With this object in view, animals which are imported for fattening, and for other purposes, that require their admission into the interior of the country alive, should be drawn, whenever possible, from uninfected regions; or, if this cannot be done, then they should certainly undergo a period of quarantine. Animals fit for immediate slaughter should, if they must be carried alive to our shores, be killed at the port of debarkation. There need be little difficulty in this. No country in the world is better situated for the carrying out of such a proposal. With numerous excellent ports, studded, in most favorable situations, all around our coasts, and railways transversing the country in every direction, there is no reason whatever why the present inconvenient, and, only too often, very cruel system, of conveying ship exhausted, and, perhaps, disabled cattle long distances in railway trucks, all over the land, and at great risk to home stock, should be continued. To abolish it, should tend to cheapen flesh from foreign sources, diminishing the chances of introducing fresh contagion, and would certainly prove most human and economical. I have no faith in port inspection, for the detection of contagious diseases, and am convinced that is a fallacy. It is impossible for an inspector to detect disease in a latent form, or to discover if apparently healthy animals have herded with those which were sick; and unless he can do this, in very many instances, his services must be worse than useless. The details which are absolutely necessary to be observed in the suppression or prevention of contagious diseases, I cannot touch upon here, suffice it to say, that they are not observed, in the country, at present, and they can only be carried into effective operation by the sanitary organization I have indicated.

With regard to the preservation of the public health, so far as its relation to animal diseases is concerned, this, also, must be left to the management of such an organization. None but the best trained veterinarians can protect the public in this direction, and until the inspection of meat and milk, dairy, stable, kennel, pasture, slaughter-house, and butcher's stall, are placed under their supervision, the public must incur risk and suffer loss. Here, one of the first essentials is the establishing of public slaughter-houses in every town and city. The majority of private slaughter-houses are simply an abomination and a disgrace to the age we live in. They are a fertile source of contagious diseases among animals. From their situation, and the way in which they are kept, they are nothing less than a public nuisance, and it is in them that animals, diseased or otherwise unfit for food, are prepared for the market. In public slaughter-houses animals can be inspected before and after they are killed, and if found to be suffering from a contagious disease, their origin can be traced, and perhaps, the *foci* of contagion be in this way discovered and extinguished The abolition of private slaughter-houses would spare unfortunate animals an amount of torture to which the public has no idea.

Such are the remarks I have ventured to bring before you, on one of the most important subjects connected with sanitary science, and the welfare of our country. I have endeavored to do so without blaming, unjustly, either governments, professions, or individuals. Governments are swayed, in such matters as this, by their advisers, and these, doubtless, advise to the best of their knowledge. In direct proportion as their knowledge is exact, and as their advice is adopted by governments, so does the public benefit. But conflicting interests may often baffle statesmen, and render them hesitating, and inclined to adopt temporizing, or half measures. In the presence of such contagious diseases as have scourged this country, during this century, half measures are worse than useless, and incline the public to lose faith in sanitary science altogether. The stern fact must be looked in the face, that for ten years, imperfect attempts, whose only recommendation was that they were cheap, have not only failed to diminish the prevalence of these maladies, which have rather increased, but they have been a source of great embarrassment to trade, and have materially tended to increase the price of food. We appear to avoid looking at things as they really are, and to shut our ears to the truth. Political, class, or party considerations should have no place in such a question as this. The loss and embarrassment may first fall upon, and be most severely felt by, the breeders, feeders, and owners of animals, but these are quickly shared by the whole nation, and the result becomes a public calamity. No country in Europe has, possibly, sustained greater loss, during the last thirty-five years, than our own country; perhaps, should have suffered less.

With the finest breed of horses, and the most magnificent herds and flocks in the world, and a teeming population, whose health and wealth are largely centred in these, we have almost entirely neglected to protect them from the ravages of disease of home and foreign origin, by forgetting to foster and encourage that science, which alone can accomplish this. That neglect has cost untold millions. Until it is acknowledged, the omission repaired, and veterinary science placed in its proper position, so that it can yield its benefits to the full, we must be prepared to record, annually, the heavy damages to health and wealth inflicted upon us through the influence of the contagious diseases of animals.

At one time, the British army suffered great losses among its horses. Through the enlightened influence of those who commanded it, veterinary science was allowed to come into play, and now disease is scarcely known, while the efficiency and durability of the animals are vastly increased. This is merely because there is an organization of trained men, and a competent central authority to guide and direct them. What holds good, in one case, must hold good in another. Let us trust that, through our influence, the public may be led to recognize this incontrovertible fact. If, in the army, they acted, in regard to this matter, as you do in civil life-their stables would soon be converted into hospitals, and the knackers would drive a flourishing trade. It only requires a patriotic resolution, enlightened views, and a well organized service, to preserve the wealth and protect the health of the country, so far as the domesticated animals are concerned.

INDIGESTION IN THE HORSE.

BY PROFESSOR PRITCHARD, V. S.

Indigestion, as popularly received and understood, arises from some irregularity in the action of the stomach, some defect in that organ, or the walls of that organ, or in the secretions and their actions upon the contents of the stomach. But, if we were to look at the subject narrowly, it would be found that indigestion might be produced in some other way than from these causes. To begin with the mouth, we would find that the food, when taken into the mouth, was masticated by means of the teeth, and mixed into saliva or spittle. This is a very important point. The food had to be crushed, and unless the teeth were in a condition to enable them to crush the food properly, and the glands were in a healthy condition, neither mastication nor salivation could properly take place, and if the food passed into the stomach in a crude state, the digestive process could not go on properly. This showed the necessity of the teeth being in a sound condition. It is not generally known that the saliva bears a very important part in the digestive process; it mixes with and softens the food, and thus renders it easier to be crushed. The taste of the food is also affected by it, and it has also a chemical action upon the food. Some animals could swallow their food without hardly any mastication. A dog, for instance, could take its food and swallow it without any chemical change taking place in the food at all. The food having been crushed and softened down in the way described, it was made into a pellet, it was conveyed down the throat, and by the gullet into the stomach. Having got to the stomach, when the stomach becomes full, another process of digestion goes on. The stomach in the horse was very small in comparison to the size of the animal, not more than a sixth part of the size of the stomach of an ox.

It would not have done for the horse to have had a large stomach, for he has to travel long distances, and if he has a large cavity, like an ox, it would occasion very great inconvenience to him.

The stomach has two coats, one a muscular coat, and the other the mucous membrane. It was necessary that the food, when inside the stomach, should be well salivated by the secretions, and unless the food was moved about it would not be properly saturated with the secretions or the gastric juice. If we were to place our ear on the left side of the ox when the first portion of the stomach was distended with food, we could hear this mixing of food going on by means of the construction of the muscular membrane. There was only one other animal that I was aware of that had a stomach like this and that was a rat. The functions then of the stomach was that of thoroughly mixing the food with the secretions of the living membrane. And it does this by means of the muscular action of the membrane coat.

Within this portion of the digestive organs they have the softening process and the dissolving of the food, by the chemical action of the gastric juices. Having undergone this process, it is not even then in a fit state to be absorbed, for it has to pass again into the intestinal canal, where it receives other fluid secretions from the liver, pancreas, &c. So that other organs, besides the stomach, if they are in an unhealthy state, have the tendency to produce indigestion. The food, which, when in the stomach, is called chyme, passes from thence into the intestinal canal. This in the horse is remarkably long, compared with flesh-eating animals.

The food which they eat contains, comparatively speaking, a small amount of nourishment, and requires a longer time for the, which it contains, to be abstracted. This is a reason for the intestines in a horse to be longer than in flesh-eating animals. The length of the intestines in a horse, is about nine feet, and an important change in the first portion of the intestines takes place before it passes the food, into the first portion of the gut. It meets here a secretion called bile, and another secretion called pancreas, and, by the action of these two secretions the chyme is converted into chyle. The liver of a horse is without a gall bladder, and in this it differs from most other mammalia. Having been subject to the action of these fluids, the food afterwards passes into the form of fæces. The extraordinary length of the small intestinal canal, which is sixty-four (64) feet in length, is for the purpose of allowing it to roll about the abdomen and shake together, like the contents of a barrel, when rolled down a hill, the fluids and solids which it contains, and thoroughly mix up and absorb the contents before they are passed into the large intestines.

After passing the small portion of the intestines, the remainder of the contents pass into the large intestines. It is there mixed with a portion of the fluid which washes out what food remains for absorption before it passes finally away. Such is the manner in which healthy digestive action is carried on. Were I asked what digestion means, I should reply that it not only meant irregularity of stomach, but any irregularity in any portion of the digestive system. I propose to speak of indigestion under two heads: The first, chronic or of long standing, and acute indigestion, which may take place in a few minutes, and terminate in a short time. I will take the acute form first. There are several causes which would give rise to this: First, there was overloading of the stomach, and taking a quantity of what was known as indigestible food.

From these two causes they had acute indigestion of two very different kinds. Suppose an animal gets to a quantity of wheat. This being a kind of food which the animal had not the opportunity of eating, he relishes it, and eats a large quantity, and thus overloads his stomach. This food having got into the stomach, and been mixed with the food there secreted, the food swells, and distends the stomach, so that the muscular coat becomes absolutely useless, and its actions wholly or partially paralyzed. Suppose a horse takes a large quantity of this kind, so that he is unable to mix the contents of the stomach properly, a small portion only of those contents is acted on by the gastric juice. There is, as we know, a great and intimate connection between the stomach and the brain. After eating a hearty dinner and drinking wine, a man feels inclined to sleep. This is because of the connection between the stomach and the brain. When the stomach of a horse becomes distended in the way I have spoken of, the animal appears unusually dull; and, as the symptoms advance, he walks to the manger or any other convenient place, and rests his head. The pulse, instead of being from thirty-two to thirty-six, falls to twenty-eight, and even in some cases to twenty-four or twenty. The eyes immediately become glassy, and the pupillary opening becomes elongated, instead of circular, thus showing the brain is being affected.

If they put him to walk, the poor animal will stagger and seem to fall. These are some of the symptoms of acute indigestion. The brain, to some persons, seems to be affected, but the animal is really suffering from an attack of acute indigestion. There is another cause: suppose an animal is taken from a stable where he has been fed on hay and corn, and gets a large amount of green food, probably clover: from this he may get acute indigestion. When the food gets into the stomach in this way, fermentation sets in, gasses escape, and the stomach becomes distended, but the symptoms are different to those in the other case. Instead of the animal being dull, sleepy, and careless, he may feel a considerable amount of pain—not perhaps acute pain, as we see in ordinary gripes and cholic—he rolls on the ground, kicks about, turns around and around, and his pulse instead of being at thirty-two or thirty-six or, as in the other case as low as twenty, runs up to fifty-five or sixty, and as the malady increases, even to a greater figure than this. The external surface of the skin shines, the flanks are distended. This arises from eating various kinds of food, such as mouldy hay, or hay badly got, or coarse dry clover, or oats covered with mould, bad oats or kiln-dried oats. From any of these causes might be expected the form of acute indigestion. If horses are kept without water for a long time, and then given a large quantity, this will also produce it, as well as irregularity of feeding.

In the first form, that wherein the horse suffers from cerebel symptom, unless relief soon takes place, a different appearance altogether comes on, and if there is no change in from six to twelve hours, he becomes affected with what is called mad staggers. He paws the ground, and runs on to show all the symptoms of inflammation of the membranes of the brain, or of the brain itself. The eyes are wild, the horse kicks about, he runs his head against the wall, he kicks out violently and knocks himself about as if he did not care what became of himself, and, unless soon relieved will die. In the other case, the evil will continue until the walls of the stomach burst by the accumulation of gas, and so the horse dies. By vomiting, a dog may get rid of the contents of his stomach, but it is seldom that a horse can be got to vomit. Something must be got into his stomach which may operate on its contents, and make them pass in the usual manner. When a horse becomes affected, as I have been describing, what should be done? In the case of stomach staggers, or the walls of the stomach being paralyzed, I would reccommend the use of strong stimulants, such as aromatic ammonia, with spirits of ether or ordinary spirits. I would also give a purgative and something to rouse the nervous system and to irritate the membrane, so as to stir up the secretions and enable the contents of the stomach to pass into the intestinal canal. When the stomach is in this distented state, if the horse was to fall down, he would be liable to be ruptured, and rather than let a horse roll or stumble about when in this condition I would place him in slings.

In all cases effecting the stomach and bowels, you can not do better than keep the horse about on his legs, in order to prevent his injuring himself. In the other case, that of the presence of gaseous material in the stomach, is different to deal with, and unless you could get rid of it, medicine is of no use. To get rid of the carbonic acid gas, I would pour into the stomach such agents as would change it into solid matter. Aromatic spirit of ammonia was one of the best things which could be used for this purpose; and hartshorn was very good; and so was, also, in a solid form, carbonate of ammonia. This given in small and diluted doses, will gradually bring about the breaking up or the decomposition of the gaseous material; they can drive it out of the stomach into the bowels, and so get rid of it.

In the other case,—the chronic form,—the evil may go on for a considerable period, and the changes brought about may be very slow in their progress. Suppose a horse in the stable or out at grass, is seen not to thrive, notwithstanding any amount of food is given to him. If they examine the coat, they will find it presents an unhealthy appearance, and the horse, as it is said, "stares" in his coat. The appetite is uncertain; he feeds well for a time, and then falls off; he becomes voracious, and eats any quanity of food, but without taking any notice of the quality. He will eat mouldy hay or even his bedding, sometimes. I have known horses when in this condition, eat soiled and stained bedding, and even, actually, eat their on fæces, just after eating a good quanity of proper food from a manger. I know a case where a horse ate plaster, and when out at grass horses have been known to eat loam or sand.

The skin appears hide-bound at such times, instead of being easily and readily moved about, as is the case at ordinary times. The action of the bowels is irregular, and the horse is often supposed to have worms. The cause of chronic indigestion may be from some defect in the mouth, or in the glands which supply the spittle. It may arise from some defect in the stomach, from want of power to contract and perform its functions, from an impaired condition of the liver, or the pancreas or any portion of the lining of the intestinal canal. Suppose a horse has any thing the matter with his teeth, and can only partially masticate his food, in this case a healthy chyle cannot be obtained, and all the symptoms of chronic indigestion are shown. In each such case, might be asked, what chances are there of the horse's recovery? I would say that this depends in a very great degree upon the length of time the animal has been suffering. If it has come on recently, I would change the quality of the food, giving a diet small in quantity, but containing a large amount of nutriment. I would give, first, a purgative, to get rid of the material in the stomach, and then I would feed the horse on a good stimulating diet. I would not treat him so as to give rise to debility, for the horse would have become very debilitated, and every thing should be done to avoid increasing that debility. Passing suddenly from dry to green food affects horses in this way very much. Suppose a change was to be made to grass, after the horse had been standing some time in the stable, if the grass was of such a kind as to afford a fair amount of nourishment, if it had been properly collected, and has not undergone fermentation, and does not produce over distention of the stomach, the change would be very beneficial. Variety of food is beneficial to all animals.

If an animal in good condition was to be fed on grass, it would afford rest to him from his usual hard labor. When horses are kept for hunting, for racing purposes, they must be fed on food which contains a large amount nourishment, such as oats, peas, or beans. They have a larger amount of work to do than animals fed on less nutritious kinds of food; and if a horse was fed properly in his stable, and his food regulated nicely, giving him a grass rest would bring about a change which sometimes would have a very beneficial effect; but care must be taken that the utmost regularity is practical, or very bad results may be brought about by the change. If, however, a horse is put into pasture which does not grow grass, or is fed on clover which has run to seed, and has been a long time growing, indigestion might be expected, both acute and chronic.

When a horse is turned out to grass, too much care cannot be used. If a horse has passed the first eight or nine years in a stable, it would not, in my opinion, do much good out in grass. He might thrive for a time by the change, but his condition would be so reversed, and his digestive system would undergo such an utter change, that it could not be of benefit. Instead of having a small portion of nutritious food, without any trouble to obtain it, he has to walk over a large space before he can get food sufficient to afford a proper amount of nutrition. It would be like, as has been observed, taking a city alderman, who has been accustomed to live on turtle and other light food, and putting him to live on work-house diet.

Then, also, the kind of pasture into which the horse was put, has to be considered. If he had been accustomed to be turned out for a portion of the year, he should not be turned out where there was a small amount of grass, or where the grass was quickly grown. This last condition has a great deal to do with the matter. It is the custom to feed horses partially in the stable, and turn them out to grass at night. Horses thrive generally when out at grass. There are cases where it is advisable to turn them out. For instance, where horses have a sand-crack, turning them out to grass rests them, and gives them time to recover. If such a horse was to to be placed in a nice soft pasture, where there would be the opportunity of gentle exercise for the foot, it would be much better than keeping him in the stable, where, by the hardness of the place on which he stands, the action of the foot might cause the crack to open again. Horn growth is also increased by the action of the moisture from the pasture. Suppose, again, a horse had met with an injury, whereby he had lost some muscle. Gentle exercise would bring it back again, and this would be best promoted by turning the horse out to grass.

Horses employed in iron work and coal pits have more laborious work than in agricultural districts, and the kind of food which should be given depends upon the nature of the work which they have to perform. I am an advocate for cutting up hay for agricultural horses, instead of their eating hay from the rack; of giving them, as feed stuff, chaff mixed with corn, rather than hay and corn; also, of mixing with their food a quantity of bran. Horses are in the habit of getting constipated bowels, and pains arising from colic, and, to prevent this, I advocated the mixture of a small quantity of bran with their food. In the iron and coal-works, they are in the habit of giving their horses a few peas or beans, but to agricultural horses, or horses employed on ordinary road work, oats should be given. I think that when horses are about to be turned out from the stable to grass, the more gradually the change is brought about the better. If they are turned out for a few hours, and so avoid a too sudden change from one food to another, it would be a good thing.

With reference to giving horses in full work the ordinary quantity of corn before turning them out to grass, I think such a plan a good one, as then the horses would not be likely to overload their stomachs with green food, and they would reap full benefit of the change of food; but I would take care to allow the horse to have the whole allowance of dry food, which h is necessary before turning him out, because if he had the grass before the final feed of corn, the stomach would be likely to be overloaded with green food, and indigestion would probably follow.

THE STATE FAIR AT ERIE.

Everything seemed favorable for a successful fair. The announcements of the premiums had been, for weeks before, widely advertised, the people had received an additional impulse to send their very best products, from seeing the Centennial exhibition of the year before. The railroads approaching Erie were all making arrangements for accommodating a large crowd. Plenty of space was assured the exhibitors by the officers, and all things appeared propitious. If the weather was pleasant, the fair could not fail to be a success. It was to be held about the time of the equinoctial rains, and many were the fears expressed, that they would interfere with the exhibition. But all fears proved to be unnecessary. Monday, the first day, opened as bright and as pleasant as could be desired, and thus it remained throughout the week. It is doubtful, if, from the whole year, a pleasanter week could have been selected.

The people in Erie had made all arrangements for the anticipated hosts of visitors. The hotels, boarding-houses, restaurants, and saloons were all waiting and anxious. Abundant provision had been made for carrying the multitude to the grounds. The Erie and Pittsburg railroad laid a special track to a convenient corner in the city. All the old band-wagons, and carry-alls that lain for many long months in dusty idleness, were brought out, dusted and hung with canvas banners, with the alluring announcement, that passengers therein would be carried "direct to the grounds. Only ten cents." The hackmen were by no means idle, for the enterprising ones had secured badges, entitling them to admission with passengers at any time. But the railroad seemed to be the favorite mode of approach. Probably more were carried on the cars than on the band-wagons, carry-alls, and hacks combined. The trip by rail takes about six minutes, owing to slow running. The cars stop at the south-eastern entrance, which is really the best one to enter first.

Once inside the grounds, the scene spread out, appears like a picture. Just in front are the buildings for manufactures. They are four in number; machinery, agricultural, carriage, and stove and furnace. Between these buildings and the fence, probably two hundred feet intervene. This space was devoted to reapers, mowers, threshers, and plows. Beyond these buildings, looking northward, could be seen the race track, beyond which was thegrand stand, band pavilion, and judges stand. Far to the north-west, silver patches of Lake Erie and the bay could be seen through the clumps of woodland, with the green fields and the white farm-houses, making a scene of beauty that many a visitor carried away in his mind. In the distant north-east, the city of Erie lay spread out with its broad and shady streets, its blocks of business houses and lines of handsome residences, with here and there the glistening spire of a church towering high toward the heavens. Looking toward the west, the rich farming lands of Erie county, dotted frequently with groves of magnificant trees could be seen, while not far off could be discerned the rolling-mills, representative of Erie's industry.

West of the four buildings just mentioned was a broad avenue, on the opposite side of which were situated the home and floral buildings, surrounding these were numerous small buildings where refreshments could be purchased, and as American crowds are proverbially hungry and thirsty, no doubt they were well patronized. Beyond was the dining hall, then the club house, where were the head-quarters oı the President and Secretary. Further west were the cattle and poultry displays, making all together or separately, an attractive scene.

The first of the buildings devoted to manufactures is situated, probably, one hundred and fifty feet from the gate. It is about one hundred and fifty or two hundred feet in length, fifty in breadth. The machinery was placed in the middle of the building, one ailse being on each side. In the center were situated the engines of Moble and Hall, which furnished the motive power for all the machinery. Beginning at the eastern end, the large cider press of Boomer & Boschert was first seen. This immense affair, said to be the same as that exhibited at the Centennial, was worthy of much attention. That the cider they manufactured was good, was proved by the large crowds surrounding it and partaking. This fact, however, testifies more to the good qualities of the apples than of the press. Near by, the King portable engines attracted the mechanic by their beautiful finish and smooth and silent running. They were small in size, and among so many large ones appeared like babes in the wood. The remainder of the building was filled with engines and saws of no particular interest, but to a certain class, and for the most part unnoticed by the average visitor. Near the western end of the building was a small model of an engine, the original of which stood by it. It was certainly a neat and attractive little piece of mechanism. Further on were a couple of water motive powers; one, a wheel, manufactured by Backus & Bro., Newark, N. J., which, although furnished by a slender stream of water, less than the thickness of a slate-pencil, yet it revolved swiftly, keeping a coffee mill attached to it in continual motion. It was probably the first time that it was exhibited at any Erie fair, for may expressions of wonder and astonishment were made concerning it. The other, Coates' water engine, was of local manufacture, but on account of the scarcity of the water supply, or the great demand for water, was unable to run.

Passing out the western entrance and crossing an open space, in which were hay rakes and mowers, we come to the western end of agricultural hall. This, unlike the Centennial agricultural hall, was devoted exclusively to farming implements, or rather to implements used in a farm-house. The exhibits in this building were arranged, similiar to those in the machine building. The building was well filled with exhibits, but it was not very popular, and after a hasty glance through it, the visitor proceeded, crossing it, to the carriage hall, this was the next building north. Here could be seen the observant farmer, closely inspecting the strong and solid looking "Jackson" and "Cortland," examining their springs, their axles, their spokes; passing by, with hardly a glance to the bright and shining phætons and buggies, for these he has no use. They are not intended for rough and rocky roads; they are well enough in their place, on the city streets, but in the country must give way to the "Jackson." Crowds at all times, were gathered around these really beautiful specimens of workmanship. The exhibits compared favorably with the best in New York and Philadelphia.

Leaving the carriage hall, the next building to the north is the stove and furnace hall. This was in size and shape like the other buildings. As if the day was not warm enough, two immense furnaces were set up and were running in full blast, just outside the western entrance. Hastily passing these, the visitor enters, on a central raised platform, were a number of new style parlor stoves, the Crown Jewel, the Invincible, the St. James, and the Radiant Home. Many of these were in operation, and the heat they sent forth was ample recommendation of their merits as heaters. On the sides were placed the kitchen cooking stoves, and rarely does a finer sight greet a housewife's eye. They were all in their holiday dress, and glistened with their bright coatings like black diamonds.

But really one of the most pleasant, if not the pleasantest spot was the building devoted to floral and fruit specimens. This was divided into two parts, the first, entering from the east, was devoted to fruits and garden produce. Long counters stretched from end to end, along the sides and in the center. On the counter at the left could be seen many varieties of vegetables. Nature with all her queer eccentricities could here be viewed. Large cucumbers, peppers, beets, and potatoes. Monster squashes, watermelons, and giant corn. This hall seemed to be the favorite of the farmers, who examined and discussed the queer looking products with an enthusiasm and knowledge that discomfited many ignorant on the subject.

The central table was filled with many varieties of grapes, it was just their season and they were in their best and richest dress, their bright coloring and large size attracted many a gazer. The north side table was filled with fruit and grains. Conspicious among these were products from southern Iowa and Nebraska, and were intended to give to the farmers abundant proof of the producing ability of those lands. The agent was on hand and comprehensively described the lands, much interesting those farmers who contemplated removing. They could clearly see that the fruits and grains were superior to any raised in this section of country. We think this plan of advertising lands to be a good one, it is much better to exhibit the products of a country, answering honestly all questions concerning it, than to fill newspapers with flaring announcements and inducements, and to distribute handbills of which no one takes any notice. This table was always surrounded by visitors.

Passing on further, under a green archway, the floral hall is entered. It may seem absurd to compare this little bower of flowers and foilage with the stately Horticultural Hall of Fairmount Park, yet, to tell the truth, we were much more pleased by it, and we heard others express like opinions. For here was not that lavish display of art which in connection with the beautiful in nature so often offends the taste. The building did not ob trude its architectural beauty upon the eye, but sustained merely the position of a back ground to a beautiful picture.

Leaving the floral hall from its western exit, we come to the western entrance of the home department. This was admirable, and really a credit to Erie. It was arranged like the other buildings—two aisles and a central table. It seemed to be the favorite of the ladies, and well it might, for it contained some beautiful fancy work. An hour could have been spent with pleasure and profit in this building. A person should saunter through it once without taking notice of any particular thing, but observe its general appearance. Then if he were to go around again, closely examining every exhibit, he would receive a very favorable idea of what Erie ladies can do. A high partition wall runs the center, and against this was displayed the collection of engravings, draughtings, crayons, and paintings, that were in competition for the premises.

On high, over the heads of the passing multitudes, were hung prize patch quilts, on which doubtless many a weary, but hopeful, had been spent, for months previous. On the side counters were arranged the articles manufactured by Erie companies, scales, spices, matches. The Burdett Organ Company occupied a conspicious place in the center of the building, and frequently could be heard the sweet and deep tones of their instruments.

The display of photographs, one of the best we have seen, was large and attractive, near the eastern entrance, canes made from the wood of the old flagship Lawrence could be purchased at a very reasonable price for a fair.

There were also many little articles of ornament, such as sleeve-buttons, breakfast castors, etc., made from the same wood. This appealed to the patriotism of the visitor, and many left the grounds provided with these handsome as well as useful relics.

West of the home building, is that devoted to satisfying the never dying wants of the inner man, the dining-hall. This was a large size pleasant building, and was in charge of the ladies of the Home of the Friendless. That the fare and style was satisfactory, can be known by the fact that these ladies comprise the best society of Erie, and have experience and taste in such matters. Every day the hall was crowded, and the home netted a handsome sum. This feature of the fair is comparatively new, but as this is its second trial, it has been found to be successful, and will doubtless be permanent. A comfortable dinner was given for a half a dollar, which was found to be very reasonable. Those ladies who wait upon visitors one day are relieved the next day, so that the duty does not weigh heavily on them. We recommend that in other cities, where the Pennsylvania State fair may be held, that similar arrangements be made by the ladies in those cities, for in that way many a deserving institution may be aided.

West of the buildings were the stalls and pens for the cattle and the coops for the poultry. These extended in long lines, east and west, and to lovers of fine stock were particularly attractive. The average visitor was attracted more by the immense size of the Scotch short horns than by any special value of blood or pedigree. That the entries were many, can be known by the fact that every stall was taken, and that new quarters were erected. Among the poultry display, which was not very large, the three legged hen seemed to monopolize all attention. This was at all times surrounded by a crowd of amused men and anxious, investigating boys, who put themselves in every conceiviable posture to obtain a better view, and to ascertain whether the extra leg really was a *bona fide* leg or whether it was a Barnumism.

The horse-stalls formed the western boundary of the grounds, and extended the entire breadth, from the northern to the southern limit. They were well filled, but, we noticed, visited merely by horseman and a few farmers.

Whatever may be claimed as the merits of the exhibits of machinery, products, or of live stock, it cannot be denied that the races presented far more attractions. Although all the buildings were well filled, yet the space around the race-track was crowded—jammed. All around the entire track was a mass of hot and sweating humanity, but, as an American crowd is bound to do, enjoying themselves. At least fifteen hundred persons were in the grand stand, and thousands more were packed around it, on fences, on boards, and on the ground. Wandering through the crowd, was a vender of ice-water. While waiting for the horses to come out, the farmers and farmers' boys amused themselves by making witty remarks about this person. The rural swain had an excellent opportunity of displaying to his rustic bride his brilliant powers of witticism. This and a brass band served to beguile the weary intervals of the heats.

If there is anything that your farmer enjoys, it is a horse-race. Whether it be on the dusty roads about his own house, after day's work is over, or whether it be on the level track at the State or county fair, he enjoys it with a keen relish; and if he believes that honesty is to be desired in any one thing, it is in horse races. A farmer can no more endure jockeying or dishonesty at a horse trot, than he can bear potato-bugs and snakes. He is willing to stake his money, and lose it honestly, but he cannot endure losing it through trickery. If his horse cannot equal his neighbor's in speed, he is willing to lose his money, if the test so decides it. But at fairs, races are generally trotted honestly. The best horse wins the prize, and the farmer is satisfied. Races are a valuable adjunct to fairs, and we suppose are among the perpetuals.

To sum all up, we can say that the recent State fair was a success. The attendance, which, more than anything else, decides it, was large. The best of good nature prevailed. The crowd did not find fault with the accommodations, praised liberally, and proclaimed themselves satisfied.

A. T. C.

DESTRUCTION AND PRESERVATION OF TREES.

This is one of the most important and most useful subjects that could be taken into consideration by the people of the United States—a subject that interests all classes, rich and poor—when we recollect that all the material essential for the subsistence and comfort of man can be produced in less than one year, while it requires three or four generations before some of the most useful forest trees are produced. The Reverend Frederick Starr, of St. Louis, has given us more information on this subject than any other writer, for which every true American should give him thanks as a true benefactor of mankind. He says that there were in the United States in 1860, 2,044,077 farms under cultivation. Could each farmer be induced to reserve or reproduce only one half acre of timber, this would give us 1,022,038 acres. This would be a beginning, but still insufficient. Each man, owning one hundred acres, ought to plant and cultivate at least from one to five acres, and keep it continually as a timber producing tract.

There was no time in the history of nations when the consumption of fuel was greater than at the present time, by railroads, manufactories, &c. Between 1850 and 1860, there was built in the United States, 22,204 miles of new railroad. New timber was required for all these. But for nearly 8,589 miles of previously existing roads, there was needed during this period, for the replacement of old timber, more than the amount required for their first construction; so that there was used in that time 65,897,020 pieces of timber, costing $23,063,957; besides, add from January 1, 1860, to January 1, 1867, 23,000 miles of new road, for all of which new sleepers were needed.

There are sixty-six occupations enumerated in the census, which depend in whole or in part upon lumber or wood, as their raw material for manufacture and commerce; employing a total of 476,623 workmen, representing in their families probably more than 2,000,000 persons. We will enumerate a few of them: Carpenters, 242,959; coffin-makers, 7,000; cabinet-makers, 29,223; chair-makers, 6,341; sawyers, 15,000; mill-wrights, 9,063; ship-carpenters, 13,397; coopers, 43,624; wheelwrights, 32,693; piano-makers, 2,578; coach-makers, 19,180; and thus proceeding until the sixty-six classes are especially named. Besides those enumerated, add fencing material for 2,500,000 farms in the United States, taking the very lowest estimate, counting only 5,000 rails for each farm, will make 12,500,000,000 of rails, and these to be continually replaced. The lumbering statistics have reached the highest figures, and are more likely to decrease than increase, while our population will increase at the rate of 1,000,000 and upwards in one year. Thus we see at once, that the day is not so very distant when a timber famine will take place; admitting, however, that it will be a great length of time before fuel will exhaust, while we can rely on coal; but timber for building purposes and mechanical purposes, is already a scarce article. Black oak commands now, even in Lancaster county $30 a thousand, at saw-mill measure. I have not the least doubt that white-oak and hickory will soon bring $50 a thousand; chestnut rails sold at $16 a hundred within six miles of Lancaster. Pennsylvania is admitted to be the leading timber producing State, but it will not furnish only eastern Pennsylvania, and some of the Eastern States, but will furnish almost all the Western States with timber, through the cheap transportation of the Ohio, Mississippi, and Missouri rivers; and, a continuation of the railroads from Pennsylvania to Kansas city, in Missouri, and to Omaha, in Nebraska, the starting points of the great Pacific railroad. By this latter railroad, now completed, a direct route is opened up clear to California. Along the valley of the great Platte river there is no timber for the space of two hundred miles; and the soil is rich and will now soon be settled through the convenience of the great Pacific railroad. New towns will spring up everywhere; new prairie farms will want fencing materials. The States of Illinois, Missouri, Iowa, Minnesota, and Wisconsin, are great prairie States, and draw on the timber States for their supply. Chicago, which will soon become one of the largest cities of the world, with its seventeen railroads centering there. The city and its railroads were built within the last thirty years, or even all the other railroads were built within the last thirty years. All our cities have increased more in the last thirty years than in any previous time.

It is now fully shown that building and fencing materials, as well as mechanical materials, can never become a cheap commodity. Since the greater part of the forests have already been destroyed in the Eastern States—and while the Central and Pacific States are to some extent entirely timberless—the next question arises, what shall we do to prevent a wood famine, or how shall we reproduce timber? You may answer: We need not be alarmed, because there never was a wood famine in the old world or continent; which will explain itself. Palestine, Syria and Egypt, Asia Minor and Northern Africa, and even some parts of Greece and Appine Europe, where the operation of causes set in action by man, has brought the face of the earth to a desolation almost as complete as that of the moon; and though within that brief space of time, that men call the historical period, they are known to have been covered with luxuriant woods. It is certain that a desolation like that which has overwhelmed many once beautiful and fertile regions of Europe, awaits an important part of the territory of the United States, unless prompt measures are taken to check the action of destructive causes already in operation. The European States had taken warning from their Asiatic neighbors. When Europe was first settled, the States, or the governments in each State, made provision originally that a certain number of acres should be set apart in each Kingdom or Dukedom for the mutual benefit of all the subjects. They would commence to cut the timber off at one end of the tract and distribute it amongst its people, annually cutting only a certain number of acres, so that when the last was cut, the first was fit to cut afresh, and they have therefore a perpetual timber grove. Besides they have their turf, so that Europe at least is far ahead of the United States in the management of their timber lands.

There is but one way to induce the people to plant and cultivate forests before necessity compels them to reproduce timber. The government in each State should offer premiums, in the following manner:

Any person who starts a forest nursery, on a small or large scale, is to be free from tax on his nursery; or any farmer who owns two hundred acres, and starts and cultivates a young forest of the size of two acres, is to have a deduction of $5 from his State or county tax; or, further, any farmer having one hundred acres, and one acre in young forest trees, $2.50 of a deduction; and so on according to size. And any one that has two hundred acres under cultivation, and no two acres in a young forest, to pay $5 extra into the treasury; and so on according to the size of the farm, etc. Through such means we would get practical forest cultivators. Nuts would become valuable; they would not be destroyed by the bushel, as is the case now. Every farmer would soon be as well posted in raising forest trees as he is in raising Irish potatoes. We are all so disposed that we will do nothing unless we feel an interest. The above plan, I think, would undoubtedly be sufficient to induce the American people to do the very thing which the next generation will be compelled to do.

The presence of forest trees on our farms would attract the obnoxious insects, which infest and destroy our fruit and fruit trees. Insects will deposit their eggs or larvæ in thriving timber. It is not out of choice that fruit trees are resorted to, but only because of the absence of forest trees; so that we might, in all probability, come back to our old times to have fruit in abundance, by transferring the borer and curculio from the fruit trees the young forest. The subject is so rich, that I could say much more. I would willingly give every information on the culture of trees from the seed, but I have already taken too much space in your valuable paper, and will leave the subject for some one more able to do it justice.

L. S. R.

BROME-GRASS, CHESS, CHEAT, (GER. ROGGENTRESPE.)

Among the grass plants, the genus Bromus, an ancient name for the oat, from a Greek word, signifying "food." The plant commonly known as cheat or chess, the Bromus Secalinus, rather to common in grain fields, is an introduced plant from Europe. This has spreading panicles, even when in fruit the drooping peduncles but little branched; spikelets oblong-ovate, turgid, smooth, of eight to ten rather distant flowers, the arms of the lower palea short or wanting.

Most of the species (Dr. Gray describes six found north of Virginia) are of a coarse quality, being strictly annuals, are of little value as pasture, and produce no after math. When in bloom its nutritive powers are the greatest, as is the case with all annuals. The cheat found among rye and wheat crops, the ripened seeds of which, ground among the flour, impart a bitter taste to the bread, and have similar narcotic qualities as *solium tremulentum*, or the Bearded Darnel. This noxious grain is occasionally found in grain fields.

The panicles of Bromus have been used in Scania, to dye green. Lowden says, also, it was *formerly supposed* that it was rye degenerated into this grass. The seeds of B. Mollis bring on gilddiness in the human species and quadrupeds, and is said to be *fatal to poultry*. The B. Mollis is the *soft chess*. This has an erect panicle, closely contracted in fruit, spikelets conical, ovate, somewhat flattened; leaves and flowers downy, lower palea acute, long armed. Here allow me to throw out a hint respecting the chicken cholera, lately so prevalent. Was the disease confined to chickens or poultry allowed to roam over the stubble? Might we not trace a connection between the disease prevalent in certain localities, with certain seed-bearing plants growing in said localities; such things have occurred, and been traced to the source. It is well to know of it, and cast our eyes around, as there is a cause that superinduces such epidemics, whether in the air or food ; and, although I believe in judgments, I also believe in natural laws, and it is our privilege to investigate those, and profit by the schooling.

Doctor Darlington says: "Among the curious vulgar errors, which yet infest the minds of credulous and careless observers of natural phenomena, may be mentioned the firm belief of many of our farmers, (some of them, too, good, practical farmers,) that this troublesome grass, (cheat,) is nothing more than an accidental variety, or casual form, of *degenerate wheat*, produced by some untoward condition of the soil, or unpropitious season, or some organic injury; though it must be admitted, I think, by the most inveterate defender of that faith, that in undergoing the ametmorphosis, the plant is surprisingly uniform in its vagaries, is always assuming the exact structure and character of *Bromus*." In the Old World they believe that wheat underwent sundry transformation, first changing to *rye*, then to *barley*, then to *Bromus*, and finally from *Bromus* to *oats!* I do not think any of our farmers will go so far, but I know that I have had severe contentions with intelligent farmers, who insist upon it that *wheat does* degenerate into *Bromus*, or cheat, they having had occular demonstration. I will cite one case, without giving the name. Mr. . . . declared, that in seeding time, he spilled a lot of good, clean wheat among the sod, near the fence, where there was not a vestige of *Brome* grass ever growing, to the best of his knowledge; that after he had scooped up all he well could, he noticed some hogs rooting up the short grass in search of the grains of wheat yet remaining; that, subsequently, *that patch of ground* was covered with *cheat*, and he could see no other about. Now, how can you account for this fact? was his clinching query. I replied, that no doubt the hogs cleaned out the wheat and turned the soil up, and the short, matted, natural grass, which had prevented the seeds of Bromus, lodged in the soil for years, from germinating, but rooted up by the hogs, and stirring the soil, had given the latent seeds a chance to come up, and they availed themselves of it and did come up. But what right had I to suppose that the seed of the Bromus was in the soil, without showing itself before? Simply because it is a seed easily choked out by other grasses. Doctor Bigelow relates a case, that in digging a trench across the Boston Common, (I think, if my memory serves me right as to the locality,) the next season the earth thrown up was covered with a strange plant—the oldest inhabitant had never seen grow there or anywhere else. On inspection, it turned out to be the *Henbane*, (Hyoscyamus Niger.) Where did it come from? The plant was perfectly natural, like in its native locality. How long had the seeds lain dominant? In short, no reasonable objection can be advanced, that such may not have been the case in Mr. . . . 's experience. I, whatever others may think to the contrary, believe in the fixed laws that pervade all matter; and there are often hidden forces to produce actions seemingly at variance with generally received opinions, that when properly understood will be found in harmony with sound philosophy, based upon a knowledge of the organic elements and principles implanted by an all-wise and beneficent Creator, and adapted to certain ends or ultimates, which may be promoted or retarded by counter laws, but cannot be wholly set aside from their final legitimate end in view by Him, who in wisdom has founded these laws to accomplish that He will, but allows man to exercise his finite powers, and by the sweat of his brow to improve the fruits and plants given to him, and to encourage him in developing the latent forces in nature, which often take place spontaneously by inherent laws—not understood as they should be.

J. S.

THE AIR.

BY J. STAUFFER.

The atmospheric air which surrounds our globe, so essential to all living beings, is not only a mixture of nitrogen and oxygen gases, with a small portion of carbonic acid gas and of the vapor of water, as given in our scientific works, but a great amount of floating particles of organic matter is mixed with the air we breathe.

Modern investigation has discovered, by the aid of the microscope, that minute animals and vegetables exist, or their germs float in the air, and hence moulds, mildew, and various fungi find a lodgment and propagate on vegetation. It is true that some very singular facts are known with regard to fungoid growth, in a manner and particularity that has given rise to the belief of spontaneous generation, simply from the change of vitality under disease to project itself in a change of form. Some eminent savants, like the author of a late work, called the Universe, or the infinitely great and the infinitely little, says on page 715: "There are plants which only appear under circumstances so exceptional and so extraordinary, that the mind revolts at the idea of their tiny seed leading the atmosphere for century after century in order, at long intervals, to fertilize some imperceptible part of the globe. This would be 'inutility in immensity.'" Then he states cases such as: "A fungus is known which never grows except on the bodies of dead spiders; another, which only appears on the surface of horses' hoofs in a state of putrifaction, &c. I hold that the same germ may develop itself very differently, according to the character of element absorbed from its nidus in growth, and readily accounts for the diversity of fungi as well as peculiar species (apparently) from or upon peculiar plants or matter, and found no where else."

All atmospheric corpuscules penetrate with the air into our respiratory organs. Hence our lungs always contain a certain amount of secula. The bones of birds being hollow, communicate with the lungs like a pneumatic apparatus. Filaments of wool and silk, tinted with rich colours, were detected in the bones of a peacock, and so to the end of the chapter, cases are given to prove how impure the air is we breathe. Have you not frequently noticed the scintillations in a ray of sunshine admitted through a hole or chink into a darkened room? You see these minute floating particles; put a little cotton in the nozzle of a bellows, so as to sift the air that you blow through this ray of light, and you will notice a *black streak*, that is, a streak purified by the sifted air from the bellows. Your breath will not mend the matter unless, by putting cotton in your mouth, you first strain the air you blow out. This brings me to notice another fact: The air is clearest before rain, that is, a moist atmosphere (not misty from falling vapor.) One of the surest signs of rain is the clearness of out line and blue color of the distant mountains; it indicates great dampness of the air. This may be a new revelation to some, but it is nevertheless true, as can be proved by any observer. Mr Tyndall has shown how it is that dampness aids in the transmission of light, while it hinders that of radiating heat The watery vapor disolves the impurities which are mingled with the air, and thus renders it very transparent. This atmospheric dust is also precipitated. In thre hot season and dry weather I have noticed how difficult it is with a spyglass, to see distant scenery, which is different in cold weather, when the air is more condensed than in summer, when it is heated and rarified.

Atmospheric refraction has very much to do with this phenomena. In the warm season, and in the months when organic life has the greatest activity, the air is most charged with this kind of dry vapor, which, in calm weather, diminishes in so wonderful a manner the visibility of distant objects. Of the various kinds of dust, only those which are soluble in water, as common salt, according to Bunsen, are always in the air, even in regions remote from the coast; these are the kinds of dust which contribute to the fertilization of the soil; the chemist Barral has even found phosphates.

Thus it is the beneficial and deliterious, like good and evil, are mixed up in the air we breathe, and it is well we have not microscopic eye, to see what the air is charged with which we drink in at every breath.

STINGING NETTLE.

DIE BRENNESSEL.—*German.*

We have four species of the true Nettle family. The classical name of this genius is Urtica, from the Latin, *Uro*, to burn.

The Urtica dioria is the great stinging nettle, and the Utrica urens, the small stinging nettle; both species are considered introduced plants from Europe, and are easily recognized by suffering them to come in contact with the back of your hands. They are a great nuisance about dwellings, and I noticed the grave yard of the Presbyterian church in Orange street, is completely over run with it.

Loudon in his Encyclopodia describes thirty-two species out of sixty-seven known to botanists. The Urtica dioria grows all over Europe, in Barbara, Siberia, and Japan, in hedges, neglected fields, gardens and pastures.

The small projecting bristles or prickles, with which they are covered, are tubular, and stand on a bag filled with a poisonous juice; they are perforated at the point, and when they are gently pressed vertically, the pressure at once forces the poison to ascend the tube, and enables the point to lodge in the skin. The tops of the tender shoots of this species, are sometimes used as a pot herb early in spring, and they have even been forced or cultivated for this purpose. A strong decoction of the plant, salted, will coagulate milk as readily as rennet, and without any disagreeable flavor. The stalk is found to have a texture somewhat like that of hemp, and is capable of being manufactured into cloth, ropes, and paper

The Urtica diora is esteemed diuretic and astringent, medicinally. In the language of Flowers, it is emblematic of cruelty. Shakspeare mixes the nettle with the coronal wreath of the lovely maniac Ophelia. The Queen describes the garland as composed of crown flowers. Nettles, dasies, and long purples; there is no question as to their emblematic meaning. They are all wild flowers, denoting the *bewildered* state of the beautiful Ophelia's own faculties; and the order runs thus—with the meaning of each term beneath:

Crown Flowers.	*Dasies.*
Fayre Mayde	Her virgyn bloome
Nettles.	*Long Purples*
Stung to ye quickke;	Under ye cold hande of dethe.

"A fair maid stung to the quick; her virgin bloom under the cold hand of death."

A more appropriate emblem could not have been devised for this interesting victim of dissapointed love and filial sorrow, so touchingly characterized by the immortal Shakspeare, who evidently was well versed in botany. In Hamlet, Act IV, Scene V, Ophelia says, "There's rosemary, that's for remembrance; pray you, love, remember; and there is pansies, that's for thoughts," as she is fantastically dressed with straws and flowers. Again she says, "There's fennel for you, and columbines; there's rue for you; and here is some for me. We may call it herb of grace o' Sundays; you may wear your rue with a difference: there's a daisy. I would give you some violets; but they withered all, when my poor father died: They say he made a good end,"—then sings, "For bonny sweet robin is all my joy," in her bewilderment.

J. S.

"HOW TO KEEP THE BOYS ON THE FARM."

This question became a subject of discussion at the October meeting of the "Lancaster County Agricultural and Horticultural Society," and elicited some very sound and sensible sentiments, expressed in a free, off-hand manner, by a number of members, as a careful perusal of the proceedings in another part of this number of our journal will illustrate.

Without intending to indulge in that fulsome flattery which is so agreeable to the "putty-brained" simpleton, but so disgusting to the man of common sense, we nevertheless desire to notice complimentarily the progress which our farmers have made—and especially the young and middle-aged among them—and the abilities they have developed since the first organization of our local society, not only in their public speaking, but also in the literary improvement of their contributions to our journal, and if we have any cause for regret, it is that the latter are generally "so few and far between."

The problem involved in the caption of these remarks, and which was the subject of the discussion alluded to, is one that is not of a very easy solution, simply because of the great diversity of human minds and temperaments. If the natural tendencies of all minds were the same, and all possessed the same degree of strength, the difficulty of elaborating a system of discipline would perhaps not be as great as it is under its present varied constitutions. We do not presume to be able to enlighten our farmers on the best course they can pursue to "keep their boys on the farm;" because, in the first place, we are not a farmer—*we sincerely wish we were*—and in the second place, perhaps, it is not advisable that *all should* remain on the farm.

We may be permitted to suggest, however, that farmers are endowed with the same mental and physical faculties which usually pertain to the rest of the human family, differing, perhaps, only in relative strength and the proclivities which are incidental to their peculiar modes of life.

Therefore, if farmers desire to have their sons remain on their farms, and pursue the honorable calling of their fathers, anterior to any system of discipline for their mental and physical training—whether voluntarily or arbitrarily exercised—is a discipline which they by self compulsion should enforce upon themselves. It is not to be expected that children will be long contented with a farm-life when their parents habitually indulge in yearnings after the occupations and speculations of the towns. The children by hereditary transmission become themselves infected by these yearning desires, and in cases where this is not so, it is only the manifestation of a temporary exception, and not the rule. But this is only the *primitive* cause of disaffection on the part of children; a *secondary* cause is the absence of those external attractions, which are incidental to the mental and moral development of a progressive people; and the false inculcations which obtain, through popular conventionalism and social misconceptions. We sincerely believe, in the language of the "great constitutional expounder" of our country, that "*the farmer is the founder of civilization;*" and, occupying that exalted position, he has nothing to look up to but his God; and whenever his mind seeks another plane of view he is obliged to look downward. This is his legitimate *status*, and it is only when he perverts or misapprehends it, that he becomes a mere "hewer of wood and carrier of water." In the degree that he can appreciate this position, in that degree will he "feel the enviable independence of an American farmer, for while he turns the furrow and scatters the seed, he has the assurance that he does not labor for a master." This self-reliant attitude need not necessarily make him selfish, imperious, ascriptive, and uncharitable; indeed, if he cultivates his mind in the same proportion that he does his fields, and does not neglect the longings of his moral nature, he will be humble without indulging in the more objectionable *pride of humility*.

THE ANIMAL AND THE VEGETABLE.

THEIR PHYSICAL RELATIONS TO EACH OTHER.

Professor Brainard, of the United States Patent Office, read before the Potomac Fruit Growers' Society, in July last, an interesting paper on the "Food and Diet of Plants," the concluding paragraphs of which, as condensed by the *Gardeners' Monthly*, are the following:

The sources of plant food may be gathered from some analyses and contrasts. Plants feed on carbonic acid, animals give it off. Plants give off oxygen, animals consume it. Plants decompose carbonic acid, water, ammonia, &c., animals produce them. Plants produce nitrogenized compounds—albumen, gluten, casein, &c., animals live upon them. Plants also produce non-nitrogenized compounds—starch, sugar, green oil, and acids; animals consume these. Plants endow mineral matter with properties of life, animals deprive them of these properties. Plants impart to chemical atoms the power to nourish animals, these reduce organic matter to a condition suited for the support of plants. Plants convert simple into complex forms, animals convert complex into simple. The plant is a mechanism of construction, the animal a mechanism of reduction. The plant is an apparatus for deoxidation, the animal an instrument of oxidation. The plant absorbs heat and electricity, the animal produces them. "From these observations," adds the editor, "we infer that animal excretions, especially urine, afford most valuable and appropriate food for plants. And our cities are impoverishing the country by emptying their sewers into the rivers. The time will come when this wanton waste will be stopped, and the wasted matters will be utilized." "A convenient method of saving this liquid manure is to collect it in a cask, and deodorize it with dry earth and coal ashes." A recent number of the *Scientific American* states that two ounces of kerosene oil and six gallons of water make an excellent fertilizer, as also an antidote to the ravages of insects. It is to be applied with a watering pot between the rows of plants and around the trees."

We have for years been thinking that the contents of cess-pools and sewers might be utilized, as recuperating elements of soil, and before the country celebrates another centennial anniversary, this subject may be more popular than it is now. On this subject, we would refer our readers to an article entitled *Chinese Agriculture*, in the August number of *The Farmer*, beginning on page 119, which contains the basis of what may ultimately have to be done in this country, if the unity of its government, or at least its civilization, continues to exist. We have now only attained our hundredth year as an independent nation, and even if we go back to the discovery of the American continent by Columbus, we are not yet four hundred years old, and already we have vast tracts of poor and worn out lands. This is not the case yet with China, notwithstanding the teeming millions of her population, and her three thousand years of agricultural experience. The relations between animal and vegetable life seem to be more practically carried into effect in that country, than they are in ours, although the scientific principles of the subject may not be so well understood among them as they are among us. It is true a vast amount of prejudice will have to be overcome before we are able to rationally utilize much that we now permit to run to waste; but the march of intelligence and the diffusion of knowledge will do much in preparing the agricultural mind of our country for any wholesome innovations that experience may finally develop as essential to our general prosperity. Many things that are now looked upon as positive evils, when their constituent principles are properly understood, may be converted into blessings. Some of the wisest agricultural philosophers are beginning to comprehend the doctrine that "there is no such thing as dirt." All *appearances* of such are merely the different phases of chemical change. By the powers of chemistry, some of the finest and costliest cosmetics and perfumes are elaborated from the common refuse of a gas factory, and we cannot fix a limit to the inventive energies of the human mind in this respect. Agriculture has, perhaps, a greater need of scientific aid than any other pursuit among men, for upon its success and its multifarious productions, the whole superstructure of human society must repose. We, therefore, ought to be willing to "live and learn," no matter from how humble a source true knowledge may spring. "Facts are stubborn things, "and it behooves us to be able to make an intelligent discrimination between "fact and fancy" when they are brought under our supervision.

S. S. Rathvon.

ANNUAL REPORT

OF THE

PENNSYLVANIA STATE COLLEGE, 1876.

REPORT OF THE PRESIDENT OF THE COLLEGE.

The past year has been one of prosperity for the college. The whole number of students who have been in attendance in the year is one hundred and sixty-one, which is greater than that of any previous year in the history of the institution.

By the exercise of rigid economy, the floating debt has been reduced to the extent of $5,700, leaving a balance of $13,000 for future payment. The funded debt of $80,000, contracted years ago in the erection of the buildings, was due on the 1st of April. We had hoped that the General Assembly of the State would provide for the payment of this indebtedness, inasmuch as the Assembly had pledged the faith of the State to Congress to provide a home for the college when it accepted from Congress, and gave to the college the funds which now form the greater part of our endowment. On account of the pressing claims of the Centennial exhibition, the expected appropriation for the college was not made, and the debt remains unpaid. However, the interest was promptly met, as heretofore, by the college treasurer; and our creditors have given us no trouble during the year. But we cannot safely presume further upon their indulgence; and we now appeal again to the General Assembly to fulfill the pledge given in the name of the State in 1863, and thus free the institution from a burden which it should never been required to bear.

Our faculty has been enlarged by the employment of J. French Sloan, B. T., as assistant in chemistry, thus permitting Prof. Lovewell to pay greater attention to the department of physics. The apparatus in the latter department has been materially increased by the judicious expenditure of six hundred dollars.

By request of the trustees the Hon. Secretary of War has detailed First Lieutenant Walter Howe, Fourth artillery, as Prof. of military science and tactics in the college, who will enter upon the performance of his duties early in 1877. This arrangement further enlarges our teaching force, and enables our former military instructor, Col. Grabowskii, to give all his attention to the department of modern languages.

On the 18th of January seventy-two of the cadets, under the charge of the commandant, visited Harrisburg and participated in the ceremonies attending the inauguration of the Governor. Their deportment and military efficiency were highly commended, and they were the recipients of many courtesies from citizens of Harrisburg, whose guests they were, and from officials of the State.

As fully as could be done under the circumstances the college was represented in the Centennial exhibition by various exhibits in the Pennsylvania educational building. Among these were a large and handsomly executed draft of the college grounds, buildings, and farms, prepared by Prof. Downey, a fine display of grains and seeds, by Prof. Hamilton, and an interesting collection of insects, injurious and beneficial, by Prof. Buckhout.

Work in the direction of beautifying the campus has been steadily prosecuted, and each season marks progress in this undertaking. A fine ground for recreation and military exercises has been in preparation for three years, and is now ready for these purposes. The services of one of the most competent landscape gardeners in the county have been secured for us for the coming spring, whereby we shall be placed in possession of plans and suggestions sufficient to direct us during a number of years.

The orchard has been improved by the addition of a hundred apple, and many other fruit trees. The vineyard, containing five hundred vines, chiefly Concorde, is in excellent condition.

In order to increase the water supply for the institution, Messrs. McAllister and Beaver have generously donated a claim which they held against the Central Experimental Farm, amounting to $1,300. From the Pennsylvania Railroad Company free passes were received to and from Harrisburg for the cadets and their officers when attending the inauguration of the Governor.

Mr. Alfred T. Sheller, of Riverside nurseries, Lewisburg, has laid us under renewed obligations by the gift of apple trees; and Messrs. H M. Engle & Son, of Marietta, have favored us with a number of the earliest varieties of peach trees. Additions to the vineyard, to the extent of one hundred and twenty-five vines, have been made by James Calder. Messrs. Savage, Keyser, and Stovell, of Frankford Chemical Works, have sent us one ton of prepared South Carolina rock, which will be tested on the plots of the central experimental farm. From the Centre County Agricultural Society we have received a large and fine collection of woods, illustrating the native species found in this vicinity.

We enter upon the new year with well-defined plans for the prosecution of the work committed to us, and with the hope that several of the obstacles which have hitherto embarrassed us will be removed. First among these obstacles is the funded debt, which so long has injured our credit, and absorbed means which should have been used only for the purposes of instruction.

Respectfully submitted,

JAMES CALDER,
President.

TREASURER'S REPORT, 1876.

To the Board of Trustees of the Pennsylvania State College:

The following statement of the receipts and expenditures of the Treasurer of the college for the year 1876 is respectfully submitted:

DR.

To balance on hand from last year,	$156 14
To interest received from the State,	30,000 00
To proceeds of notes discounted at various times,	19,526 00
To amount received from students,	5,857 93
To cattle sold,	1,978 25
To wheat sold,	604 87
To cash from other sources,	258 31
	58,379 50

CR.

By orders of James Calder, President, paid,	58,043 36
Balance in treasury January 1, 1877,	336 14

JOHN HAMILTON,
Treasurer Pennsylvania State College.

The undersigned, a committee appointed by the Board of Trustees of the Pennsylvania State College, at the regular annual meeting held at Harrisburg, this sixteenth day of January, A. D., 1877, to audit the account of Professor John Hamilton, treasurer of said college, do hereby certify that they have performed that duty, and have carefully compared the credits claimed by said treasurer, with the vouchers in his hand, and the receipts with the books and accounts of Doctor Calder, president of the college, and that they find the same to be correct, and the balance in the hands of said treasurer to be three hundred and thirty-six dollars and fourteen cents, as stated above, and in the foregoing accounts.

F. JORDAN,
CYRUS GORDON,
W. T. HILDRUP,
Committee.

COLLEGE OFFICERS.

TRUSTEES.

Ex-Officio Members.

His Excellency JOHN F. HARTRANFT,
Governor of Pennsylvania, Harrisburg.

Honorable M. S. QUAY,
Secretary of the Commonwealth, Harrisburg.

JAMES CALDER, D. D.,
President College Faculty, State College.

. . . . ,
President of the State Agricultural Society.

General WILLIAM MCCANDLESS,
Secretary of Internal Affairs, Harrisburg.

General JAMES W. LATTA,
Adjutant General, Harrisburg.

JAMES P. WICKERSHAM, LL. D.,
Superintendent of Public Instruction, Harrisburg.

Professor R. E. ROGERS,
President of Franklin Institute, Philadelphia.

ELECTED MEMBERS.

James Kelly, Esquire, Wilkinsburg; William T. Hildrup, Esquire, Harrisburg; Dr. A. Smith, Wernersville; John DuBois, Esquire, Williamsport; Cyrus Gordon, Esquire, Clearfield; Honorable A. Wilson Taylor, Indiana; Honorable John H. Orvis, Bellefonte; Henry T. Darlington, Esquire, Doylestown; Charles Parrish, Esquire, Wilkesbarre; James Miles, Esquire, Miles Grove; Honorable Daniel Kaine, Uniontown; General James A. Beaver, Bellefonte; Honorable Francis Jordan, Harrisburg; Colonel Thomas A Scott, Philadelphia; Henry T. Harvey, Lock Haven.

SUPERINTENDENTS, &c.

William Calvin Patterson, Superintendent of College Farm; P. O., State College, Centre county.

William C. Huey, Superintendent of Central Experimental Farm; P. O., State College, Centre county.

John I. Carter, Superintendent of Eastern Experimental Farm; P. O., West Grove, Chester county.

T. A. Hood, Superintendent of Western Experimental Farm; P. O., Indiana, Indiana county.

Professor William A. Buckhout, Librarian.

Professor John Hamilton, Business Manager.

Professor William A. Buckhout, Secretary of the Faculty.

REPORT OF THE PROFESSOR OF AGRICULTURE FOR THE YEAR 1876.

To James Calder, *D. D.*, *President of the Pennsylvania State College:*

The Professor of Agriculture respectfully reports that he has visited each of the three experimental farms during the year, and that he finds them improving both in appearance and in the condition of the soil. The crops have been uniformly good as will be seen by reference to the reports of the superintendents, copies of which are made part of this report.

The Eastern Farm, under the superintendence of Mr. John I. Carter, is maintaining its position of usefulness in the locality in which it is situated, and is carrying out the programme of the Board in nearly every particular. By some misunderstanding several plots were not used for the purpose prescribed, and this is the more to be regretted since the experiments are now confined to but two of the farms. The fruit upon the eastern farm is a source of very considerable profit. The superintendent reports a large yield this year, and it has aided very materially in running the farm under the reduced appropriations.

The Central Farm, superintended by Mr. William C. Huey, has been carrying out the programme in accordance with that prescribed by the Board of Trustees.

The appropriation to this farm has been six hundred dollars for the past year. The dwelling-house has been repaired by removing the strips and covering the plank sides with planed weather boarding. A new porch has been built along the front, and the whole painted with two coats of good lead paint.

On the 14th of January, 1869, the firms of McAllister & Beaver and Thompson, McFarland & Co., entered into an agreement with the Central Experimental farm, by which they would furnish stock and implements to the amount of two thousand dollars for the use of the farm, with the understanding that at any time within five years the farm could, by paying fifty per cent. of the cost of the articles, gain full and complete control and ownership over them, otherwise the full amount was to be paid, with the accrued interest. The account has been settled by paying Thompson McFarland & Co. their share, and recently the firm of McAllister & Beaver have donated to the college their part, amounting, together with the accrued interest, to about $1,300.

The orchard upon this farm is now coming into bearing, and during the year over twenty new trees have been set out. A fine herd of Alderney cattle is now upon the farm, and their presence is due to the kindness of Mr. W. T. Hildrup, and Mr. William Calder, in presenting quite a number of these valuable animals to the farm.

Mr. Thomas C. Hood, superintendent of the Western farm, reports considerable improvement of that farm, and this is more to be noticed inasmuch as the whole of the labor was performed by Mr. Hood himself, aided only occasionally by one hand. This farm has been in debt ever since its purchase by the college, and although the greatest efforts have been made during the last four years to remove the debt, there is still a balance of $282 66 remaining. In view of the fact that there seems to be but little hope of increasing, at least for the present, the installments to this farm, and in view of the fact that the experiments upon this farm have been discontinued until the land can be drained, it became necessary that some means be devised to cut down the expenses so as to attend to these much needed improvements. Upon consultation with the local trustees and with the executive committee of the Board, it has been determined to lease the Western Experimental Farm for the year 1877, in order to use the appropriation for the improvement of the land. An agreement has accordingly been entered into by the college and Thomas C. Hood, the former superintendent, by which the whole of the appropriation for the ensuing year can be used for drainage and other improvements of the property. A copy of this agreement is presented along with this report.

At the meeting of the Board of Trustees, in January, 1876, a committee was appointed to take into consideration the sale of a piece of this farm, lying next the fair ground of the Indiana County Agricultural Society, and the purchase of a strip of land belonging to John Wischmen and Terence Rice, and running down through the middle of the Experimental Farm, and greatly marring its appearance.

The committee, after examining the land, sold to the Indiana County Agricultural Society, for the sum of $807 50, 2 acres and 3 perches, and had the deed for the same made out and transferred to the Society, and is now recorded in Book B, No. 41, page 8, in the office of the Recorder, in Indiana, Pa.

The committee then purchased from Terence Rice and wife, 1 acre and 17 perches of land, for the sum of $221 25. The deed is dated April 17, 1876, and is recorded in Book B, vol. 41, page 23, in the office of the Recorder, in Indiana, Pa.

Also, another lot of land from John Wischmen and wife, containing 3 acres and 112 perches, for $740 00, the deed being recorded in Book B, No. 41, page 24, in office of the Recorder, in Indiana, Pa. This transfer of property has added very greatly to the value of this farm.

The thorough draining of this farm is indispensable to its success, and some effort should be made this coming year to accomplish this work; the fences need to be replaced by new ones; the barn needs new sills and new weather-boards, and should be well painted; a corn crib, pig pen, and tool house should be erected as soon as the funds of the farm will permit.

It is suggested that it might be well for the Board of Trustees to appoint some of their number a committee, whose duty it shall be to visit each of the farms at least once each year, and report upon their condition, and suggest methods for increasing their usefulness.

Respectfully submitted.

JOHN HAMILTON.

To JOHN HAMILTON, Esq.,
Professor of Agriculture, &c.:

SIR: I herewith submit statement of financial operations of the Eastern Experimental Farm, for the fiscal year, 1876. I also append results of experiments made under your direction.

You will be pleased to notice a gradual increase in the amount of sales, indicating an improvement of the Farm.

Although the prices of fruits ruled very low the past season, yet the income from our orchards and vineyards show the profitableness of this branch of agriculture. Our method of cultivation and treatment with mineral fertilizers continues to be satisfactory.

I might add that our experiments with commercial fertilizers continue to show, that soluble phosphate of lime is the most reliable or most needed fertilizer with us. The application of special compounds, purporting to furnish all the essential elements of plant food, have not proved profitable; neither have very heavy applications of really good fertilizers made correspondingly large yields.

Trusting the above report may meet your approval, I respectfully submit it.

Very respectfully,

JOHN I. CARTER,
Supt. Eastern Experimental Farm.

December 1, 1876.

REPORT OF CENTRAL EXPERIMENTAL FARM FOR 1876.

CENTRAL EXPERIMENTAL FARM,
PENNSYLVANIA STATE COLLEGE, *December 1, 1876.*

To PROF. JOHN HAMILTON, *Prof. of Agriculture, &c.:*

SIR: I have the honor to transmit herewith the accounts of the Central Experimental Farm, for the year just closed. The roads have been well cleaned as far as they extend around the place; the last stone pile has been buried, which adds much to the appearance of the fields as well as rendering more land fit for cultivation.

We have made some needed improvements to the house, which greatly increases the comfort as well as appearance, and which this cold weather but proves were absolutely necessary. We have had the misfortune to lose two fine Alderney calves, one being full blooded, the other three fourths; but have succeeded in raising a fine full blooded heifer. Our Alderney herd is increasing in value as the milk and butter account will show; yet much cannot be expected of them as yet, all being heifers between first and second calf; hope to make greatly increased report each year over the preceding. The court of Centre county has granted the right to citizens to run a road along the northern side of the place, which necessitated our building a fence on our side of it; this will, perhaps, be the only unusual expense we will incur. The crops now look very well, the indications so far is a good harvest. Our experience in feeding cattle this year was not quite as successful as we hope to report in succeeding years.

All of which is respectfully submitted.

W. C. HUEY,
Superintendent.

REPORT OF THE WESTERN EXPERIMENTAL FARM, DECEMBER 1, 1876.

To Prof. John Hamilton,
Prof. of Agriculture in Pennsylvania State College:

The undersigned, superintendent of the Western Experimental Farm, desires to report that during the year very little extra labor has been hired, and what has been accomplished has been done by the superintendent, assisted occasionally by one or two hands. The crops have been reasonably good, and the general condition of the farm materially improved. The purchase of the strip of land in the center of the farm has done much to increase the apparent value of the property. The interior fences have been entirely removed, and a great many stumps extracted. The old fence rows have been cleaned up and stones removed from the field, and the balance of the woodland cleared up and put out in grain.

The financial condition of the farm will be seen in another part of this report, also the inventory of the property on hand.

Respectfully submitted.

Thos. C. Hood,
Superintendent.

TRANSACTIONS

OF THE

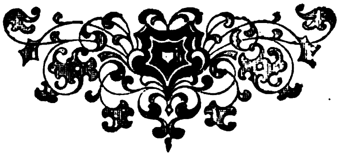
PENNSYLVANIA STATE
DAIRYMEN'S ASSOCIATION,

1877.

THIRD ANNUAL REPORT;

WITH

ADDRESSES AND DISCUSSIONS.



OFFICERS OF THE ASSOCIATION.

PRESIDENT.

A. M. Fuller, Meadville.

VICE PRESIDENTS.

Hon. Eastburn Reeder, New Hope, Bucks county.
Robert Smith, Phillipsville, Erie county.
D. P. Fritz, Waterford.
John Cole, Venango.
William Nash, Crossingville.
G. W. Carroll, Union City.
H. Canfield, Miller's.
G. R. Steadman, Franklin Centre, Erie county.
J. R. Taylor, Edinboro'.
Judge Wetmore, Warren.
I. R. Hall, Randolph.
John Fuller, Harmonsburg.
Moses Ruder, Erie.
A. E. Harper, Meadville.
Thomas Cochran, Sheakleyville, Mercer county.
E. W. Hamilton, Cherrytree, Venango county.
——— Proctor, Columbus, Warren county.
D. H. Nodine, Cochranton.
William Crawford, Titusville.
L. H. Reall, Philadelphia.

SECRETARY.

H. Cooley Greene, Meadville.

CORRESPONDING SECRETARY.

J. M. Bigger, Cambridge.

TREASURER.

Samuel B. Dick, Meadville.

INTRODUCTION.

To the readers of this report, the secretary desires to express his gratification in being able to report progress in the dairy.

The situation is favorable, indeed, to the interests of the dairyman.

The shipment of butter to Europe begun in 1876, as a doubtful experiment, on low grades only, has led to the profitable exportation of the better grades this year, and to an extent that has exerted a perceptible effect upon the market price. This trade, like that in dressed beef, bids fair to assume large proportions in the near future, and by opening new outlets for our products, to postpone indefinitely the bugbear of overproduction, which has been the terror of the timid for many years.

As nature has provided a force by which the accumulated waters of the mountain districts are carried forward by ten thousand streams to the great sea, where there is always room for more, and will be to the end of time, so Providence gives us a growing demand for our dairy products, that keeps space with the present rapid increase of production, and is taking our goods at prices, that in view of the present financial pressure, are beyond reasonable expectation, and out of proportion to other commodities. The export trade is now taking fully three fourths of the receipts at the seaboard.

The dairy regions have been favored with good pasturage in general, though we heard, from some limited localities, a cry of drought and early shrinkage of milk yield.

The yield of cheese is in the aggregate large and the quality fine, and the foreign demand for American cheese has been so active, that the product of the spring and summer months have been shipped more closely than ever before, and at prices that should be entirely satisfactory to the producers. Indeed, the rivalries of the trade have turned in such a manner that the producers have received full value for their goods, allowing but a very narrow margin for profits, if any, to the purchaser, so that the "bloated middleman" could now be squeezed through a moderately "strait and narrow way." The term "bloated" may soon be more appropriately applied to the producers, who are certainly enjoying the fat of the land.

Altogether, the outlook for the dairy interest is encouraging, and it behooves all who appreciate the labors of dairy organizations, by which, in a large measure, these results have been achieved, to encourage every endeavor to spread before the people facts and ideas of value, and secure the permanent establishment of the dairy in the front rank of agricultural interests. The energies of the Pennsylvania State Dairyman's Association are devoted to this end, and the secretary, in placing this report before the public, does so in the hope that it may contribute to awaken a more general interest in the public mind, and inspire a proper appreciation of the present resources and future capabilities of our country in this direction.

GENTLEMEN: Precedent, it is said, to a certain extent governs the present, and as it has been customary, and is expected, that the president of such an organization as this shall contribute somewhat to the entertainment, and, appreciating the situation, I take pleasure in again addressing you briefly upon topics of local interests, in connection with a review of the present condition of the dairy interest throughout the country.

I have chosen as a subject one which fortunately affords me the greatest latitude in its presentation and discussion.

PENNSYLVNAIA DAIRYMEN'S ASSOCIATION.

Annual Convention held at Cambridge, Pa., December 27, 1876.

ANNUAL ADDRESS BY THE PRESIDENT—THE DAIRY BUSINESS.

Dairy agriculture in this country, on the associated dairy system, is generally conceded to be as yet in its infancy. The introduction of this industry as a specialty, confined to certain districts remote from each other may be said to be of recent origin when we consider that it is only for the brief period of sixteen years that cheese has been exported to any great extent, and but twenty-six years since the introduction of the associated system in this country. At the present time, no less than eight States can point to some portion of their territory that is specially devoted to the manufacture of dairy products, the greater portion of which is designed for export; and I believe no agricultural interest, in recent years, has made more rapid progress, or proved more remunerative to the producer, than dairy farming where it has been made a specialty.

The discussion of this subejct—"The Dairy Business"—I wish to be understood as referring to it in the broadest sense, without any special reference to the manufacture of cheese alone.

During the past season, I have had frequent discussions with farmers and dairymen upon the comparative merits of the various branches of farming practiced in this section. I give, in support of "dairying," and as applicable to this section, the opinion of that eminent authority, X. A. Willard, as follows:

" Compared with the great interests of the country—such as the production of wheat and corn, or other serials, the raising or fattening of stock for the shambles, sheep husbandry, and the like—each and all are inferior in their remunerative prospects to the dairy. In the first place, the milk producer enters the great markets of the world with less competition than he who is engaged in almost any other branch of farming. He has a wider range, and a more diversified product to dispose of. The milk farmer may be a breeder, to some extent, of thorough-bred cattle. After the first outlay, (and that may be on a small scale at the commencement,) the expense of raising a thoroughbred cow will be no more than the raising of the meanest scrub of our common stock. Then, if there is any profit in fattening stock for the shambles, animals which fail in milk for the dairy, and are to be 'turned,' can be employed for the purpose. Both of these specialties are in the line, and connected with the dairy, as is also the fattening of swine on dairy slops. Again, the yield of his cows takes three forms of a commercial product, each of which enters into universal consumption, and is regarded both as a necessity and a luxury—milk, butter, and cheese. The last two are highly concentrated forms of food, and less bulky to transport than other articles of food of the same value. We cannot afford to grow corn, for the West, with its rich prairie and bottom lands, can undersell us, and so also in the article of wool. The immense plains of Texas and the West are competing with us, and can always afford to sell for less money than it costs us to produce it."

Wool growing is argued by many to be superior and likely to prove as profitable in this section as darying. We have but to refer to recent statistics to prove the fallacy of this argument. Wool growing in the West has attained enormous proportions. It will answer our purpose, however, by reference to our State only.

California, in 1855, (at the time when associated darying was first introduced,) produced 360,000 pounds of wool. In 1875, she produced 42,532,223 pounds. It is reasonable to suppose that there has been in recent years a corresponding development of this industry. On the part of other Western States, and in view of this fact, can we in this section expect in future to engage profitably in this branch of farming?

Crawford county, in 1850, had attained an enviable notoriety as a wool-growing section, producing above 1,000,000 pounds. In 1875, it would scarcely exceed 200,000 pounds, and sold at the average price of thirty cents a pound, certainly not the cost of production.

During the past ten years, the agricultural productions of this section have undergone a complete change, and although possessing the reputation of being located in one of the finest farming districts of the State, yet having no reputation for the production of any specialty in agriculture. Fortune has favored us, however, and we have now every prospect of both profit and reputation in the establishment and extension of the dairy business. The question arises: Can the business be overdone? Will there be an overproduction by our dairies in the near future?

It is characteristic of the American people to undertake any project in which there appears the slightest probability of success, oftentimes without having given to it sufficient investigation and forethought; and we find this exemplified in the dairy business, no less than in other business projects. Factories have been built and territory developed, which, in the course of events, when supply and demand in dairy products shall have been equalized, and prices reduced to their lowest mark, will, from the natural differences of soil, herbage, water, climate, or marketing facilities, of necessity, prove weak, and must first succumb to the continued advancement and prosperity of more favored districts.

To turn to our own section—do we not excel in all that is requisite for the production of fine dairy goods? In all the qualities mentioned we certainly do, but it is questionable whether we are as yet possessed of one most important quality—the requisite "skill." This differs from the other defects, however, in that it can be overcome. I believe that the greatest advantage possessed by any section, other things being equal, is a good supply of pure water and exemption from drought. I state, without fear of contradiction, that I do not believe that at the present time any dairy section equals ours in this respect—not excepting central New York. It is also claimed by the best authorities on dairy matters, that the area of territory in the country that may be profitably devoted to dairying is quite limited, and, in the older States, is very clearly defined at the present time. Taking all things into consideration, I believe we have little to fear from overproduction in the near future, leaving out the question as to the probability of an increased consumption of butter and cheese, and the opening of new markets for their disposal.

The merits of such a business should not be judged by the result of one season only. Dairy products are more liable to fluctuate in price than any other farm product, owing, in part, to their perishable nature; also, dependent upon the season and the state of the home and foreign markets. A dairyman may strike his balance sheet once in five years, and not till then can he form a true estimate of the profits of the dairy business.

For the better information and benefit of those directly engaged in the dairy interest, I have endeavored to ascertain, so far as I might be able, the present condition and future prospect of dairying at various points in the United States and in Canada, believing that reliable information upon this point must prove of value and assistance in canvassing the future of the interest. I have not been able, in all cases, to secure as definite and full information as I had hoped for, but am enabled, by the reports that have been received, to present a brief synopsis of the condition of the business in the several sections.

Mr. O. S. Bliss, of New York, reports that: "Our dairymen are prosperous, and our dairy interests in a more healthful condition than any other. The production of the last season has hardly been above the average, as the season has been quite dry, but it has been fairly remunerative. Our butter still maintains its rank in the market, and our cheese (what little there is of it) holds a top position, though we are, year by year, producing less cheese and more butter, and, it is said, Vermont will not again produce enough cheese to supply her home market. There is more profit to us in butter-making; (the few cases where there are excellent facilities for marketing excepted;) cheese will be the exception."

D. W. Curtis, secretary of the Wisconsin Dairymen's Association, says: "The present condition of dairying in Wisconsin is very flattering, and the future prospect good. Our dairymen are manufacturing a better class of goods than formerly, and are bound not to be excelled in this respect. We trust that the day is not far distant when Wisconsin will be ranked as the leading dairy State of the north-west."

Colonel Harris, secretary of the Ohio Dairymen's Association, reports: "The outlook for the dairy business in Ohio is not very encouraging, though dairymen will continue the business as they have in the past. The farmers are wintering more stock than usual, which is a good sign, and the dairy business will continue to flourish."

From central New York, we have reports from Mr. B. B. Moon and E. J. Burrell, Esq. Mr. Moore says that the great natural advantages possessed by the dairymen of central New York, have so firmly established the business, that dairying in that section may be considered to rest on a permanent basis. He advocates the raising of stock for the dairy, rather than the buying of cattle from Canada and the West.

Mr. Burrell, of Little Falls, New York, reports of the condition of the interest in central New York—that he does not anticipate an overproduction of butter and cheese as likely, and if it should occur, the sections from whence freights are high, and some time is consumed in reaching the market, must first suffer. Fine cheese is growing yearly to be more and more in demand, to the retirement of inferior. This was more decided this season than ever before, and must grow. One of the great points, I think, is to make the cheese sufficiently fine, so that they will not come to maturity in twelve to twenty days, but take thirty days, and then hold right for not less than thirty days more. As it now is, a cheese may show very well in New York, having first arrived at maturity; but, after fourteen additional days' voyage, and getting into its proper showing shape, it will exhibit symptoms of decay. Our foreign correspondents say, this season, that American cheese have not held their record in quality. It may be so, and if so, we can easily account for it by referring to the season; never has there been a more difficult one in which to manufacture cheese.

Mr. H. Farrington, of Canada, sends the last report of the Dairyman's Association of Canada. The facts to be gleaned from it are: That the dairy interest of Canada is in a prosperous condition—that the constant aim is to improve the quality of their production—that there is a largely increased production of butter as well as cheese—much value is attached to dairymen's associations, and that the main organization receives $700 a year from the Government for its support, and the better advancement of the dairy interest.

John R. McLean, Esq., Secretary of the Elgin (Ill.) Board of Trade, reports the dairy interest in Illinois as prosperous. One hundred and twenty seven thousand, three hundred and fifty-six boxes of cheese were sold at the Board of Trade during the past season; also, 829,267 pounds of butter. The factories average about 500 pounds each. The price of cheese has ruled very low, but is now firm in price. Part skim is selling at 11½ @ 12¾ cents; full milk at 12 @ 12½ cents. The stock of both butter and cheese is light at the present time. We believe, in this section, that the demand for first quality butter or cheese is constantly on the increase, and that another season will show renewed prosperity in the dairy business in Illinois.

Having discussed, to some extent, the prospect and present aspect of the dairy business throughout the country, I should feel that the effort would be incomplete without a brief reference to its present condition in our midst.

The season that has just closed, presents its lessons of experience, and it seems proper that we should discuss them with a view to the introduction of needed reforms, and the adoption of plans best suited to the further advancement of the interest. I should take greater pleasure in eulogizing the progress and success of this important business, than in pointing out its defects; but if any good is to be accomplished in this respect, it will be by a discussion of the demerits, not the merits, of the present management of the business. A surgeon is called to see a patient, not to tell him how much of his body is sound, but to probe and suggest remedies for the diseased spots. We will first refer, briefly, to the need of a

Better Organization

Of the several factories at the opening of the season, in order to insure harmony, and prevent possible complications.

We believe that the majority of patrons are too slack in their mode of doing business. True business principles demand that matters of business existing between several individuals, no matter how trivial, should be conducted in the most careful manner, and thereby prevent the probability of any misunderstanding, and, in the event of a disagreement, afford a basis upon which to effect a settlement.

Communities are frequently organized and factories started, merely by a common understanding, which is probably never fully understood by more than two or three of the parties concerned. This can hardly be termed business like. Every factory should hold a meeting at the beginning of the season, and formally elect a secretary, treasurer, and salesman, and make a contract with the manufacturer that will "hold water." More care should be exercised in the selection of a salesman—I use the word in the singular number, because I do not believe it is policy to have more than one salesman. Changes of salesmen from year to year, except for cause, is not desirable. The average salesman will be better qualified for his position in his second than in his first year. In all cases, the salesman should be properly remunerated, in order that he may be able to obtain all information in regard to the markets that may be attainable; and he should be required to report his transactions in full to the secretary. Secondly—in regard to

The Management of Factories,

It is to be earnestly hoped that the time will come when the patron will seek the manufacturer, rather than the manufacturer the patron. This is an evil, difficult of cure; but we believe another season will open with a better understanding among manufacturers, which will tend, partially, to do away with the unprofitable rivalry which has heretofore existed between factories. This is the present real bane of the interest—unprofitable to the factoryman, and demoralizing to the patron. The present low rates for manufacturing—the valuable, though expensive experience, gained by those who have bought milk extensively, and an appreciation of the fact that no one can foretell the future of the market, may do something towards abating this evil. In regard to the

Price for Manufacturing,

The rate as now adopted is very low, and, only in exceptional cases, profitable to the manufacturer—certainly not sufficient to warrant him in adding necessary improvements to his factory and machinery.

I desire to call the attention of patrons to one important point, very materially affecting their interests, and would suggest that they take some definite action in the matter, believing that the beneficial results to be attained in one season will well repay the outlay—and that is, the necessity of renovating the curing rooms of our factories. I do not wish to encroach upon Prof. Arnold's subject, but merely introduce the matter, knowing that he can assist us by pointing out the most feasible plan to be adopted. There are but few factories in this section that may be said to be perfect in this respect. I quote the opinion of an English dairyman, recently published in the Ithica *Herald*, bearing upon this subject. Speaking of American cheese factories, he says: "The curing-rooms were seldom fit to cure cheese in; the walls, boarded on the outside only, were not sufficient protection against either the heat of July or the cold of November. The windows, in most instances, were needing outside shutters to cover them from the hot glare of the midday sun; and he found the temperature, as indicated by their own thermometers, during the warm weather, to be about 90° Fah., when, in spite of the severe heat of the past summer, it need not have risen above 70°. It is not surprising, he thinks, that it is more difficult to turn out fine flavored cheese in summer than in autumn.

"It would be unreasonable to expect any cheese to pass through such an ordeal as three weeks at 90°, and come out uninjured. He found a few factories where, with double walls, Venetian shutters to the windows, and the habit of opening the latter during the night and closing them by day, a far lower and more equable temperature was obtained than is generally the case. There is not a point more important than the control of the temperature in the manufacturing and curing-rooms, and none more constantly neglected by owners and cheese-makers."

I have, heretofore, carefully avoided the discussion of all subjects not properly within a strictly business view of the management of the interest, and my only apology for not doing so in this case, is from the fact that the subject is not only one of importance to the success of the interest, but that I am informed by many factory men and factory proprietors that the present rate for manufacturing, with few exceptions, does not prove sufficiently profitable to warrant them in making any further outlay on their factories, and, if anything is to be accomplished in this direction, it must be by the coöperation and assistance of the patrons; hence patrons would do well to consider this subject at their spring meeting for organization.

In this connection, I desire to refer to a point touching the interest of the manufacturer. The rate for manufacturing, as now established in nine tenths of our factories, is not remunerative or encouraging to the factory men. It may pay the running expenses of the factory, if the management is economical, but it pays nothing upon the investment. This is not right. The patron, moreover, does not support the factory man in one important respect, and we believe this should receive great attention another season, viz: The patron obliges the manufacturer to accept a minimum rate, without any guarantee on his part. The patron should agree, in sending milk to the factory, to continue to do so the entire season, and not withdraw his patronage, except by consent of the manufacturer; and in case he should violate his agreement, the manufacturer should be allowed a larger percentage for the time the patron has sent his milk.

Many patrons report that the factories have not made them paying returns the past season, and you will find, in many cases, that the patron has withdrawn his milk after the summer make of cheese. Had he not done so, what would have been the result had he continued his patronage? He has sold the butter made during September and October at an average price of 25c. per pound. The cheese made during these months should have netted 10c. to the patron, equivalent to 30c. per pound for butter, which would have proved as profitable to the patron, and at the same time given support to the factory man. Patrons should consider that their interests are wholly identical with those of the factory man, and that if the business is to be made permanent and successful, there must be coöperation and good will upon the part of all.

A brief reference to the

FUTURE OUTLOOK OF THE DAIRY BUSINESS

In this section, and we shall have done. Mr. Burrell reports that the amount of cheese held in New York, December 7, was 200,000 boxes. At the same date last season the stock held was probably 275,000 boxes. The receipts in New York from January 1, 1876, to May 1, 1876, were 219,000 boxes. He estimates the probable receipts for this season (from January 1, 1877, to May 1, 1877,) at 100,000 boxes, and says that old cheese will go out well, and, consequently, the new make will come in with high prices. Neither London nor Liverpool has a large stock on hand; a great many English cheeses are reported poor, and the make for the past season light. Make fancy cheese in keeping quality, especially, and you will have no difficulty in receiving full prices.

We may gather from the various reports received, that there is a firm determination, on the part of these sections, to aim at an improvement in the quality of their production. It might be well to refer to the result here, the past season, as having an influence on the course to be adopted by manufacturers in the future.

During the heated term the past season, several shipments of skimmed cheese arrived in New York in better condition, and brought a higher price, than full milk cheese. Some may argue that this is an indorsement of skim cheese, whereas it is not, as we consider the facts in the case. In the first place, it was an exceptional season, and the heat had a tendency to develop and improve the skim cheese, while in transit, and to ruin the whole milk cheese. I am informed by the very best authorities, that had the whole milk cheese been properly made, possessing the keeping qualities that Mr. Burrell mentioned, the heat would have had very little effect upon them; hence, let us properly understand this matter, and, after an examination into the case, endeavor, by exercising greater care in manufacturing our goods, to increase our already enviable reputation for the production of first-class dairy goods.

As to what we may reasonably expect another year in regard to prices on cheese, I fear some may be led to expect too much from the high prices which have ruled this fall. The opening of the season may show highly remunerative prices, which may stimulate production, and so soon as the markets are supplied with the new make, we may experience a rapid decline in price.

We have often argued, in times past, that the proper mode of selling cheese, is to move it as fast as it is ready for market, and, more particularly, the early and summer made cheese. We have made the frequent mistake of holding our cheese back longer than we should, caused, in many cases, by the lack of sufficient confidence in dealers and commission houses to warrant our consigning it. To obviate this difficulty, I believe the salesmen should organize in due season, make arrangements for ample reports, and, if thought advisable, again appoint a committee to report upon the standing and reputation of largest commission houses, enabling us to consign with some degree of confidence. The effort made by the Board of Trade, in June last, in this respect, was productive of good results. To my knowledge, several thousand boxes of cheese, which were forwarded on commission, netted one cent per pound more than the subsequent sales made here, from the fact that the May cheese at that time was in good condition, and that portion which was held back not only deteriorated in quality and value, but encountered a further decline in the market.

It is more from a sense of duty than of pleasure, that I have endeavored to discuss the present needs and reforms deemed necessary to the success of the dairy interest in this section. Nothing can alter my firm belief that dairying, in some form, must prove in the future our chief agricultural industry, and while there are many obstacles to overcome in the succesfsul prosecution of the associated system of dairying, it might be well to remember that every business enterprise is burdened with its objectionable points, and that it is a truthful, though common saying, that every man thinks his neighbor's business better than his own.

"THE COW AND HER FEED."

ADDRESS OF MR. J. F. ELSOM, OF THE "CHAUTAUQUA FARMER."

Mr. President and Gentlemen of the Convention: I Suppose you expect, in accordance with the usual custom, some very fine statistical information, but I would much rather sit still and listen to others than attempt to say anything for myself; but all cannot do this, and I will bear my portion of the duties with the rest.

In doing this, I am placed in somewhat the same position the boy was who attempted to set the hen.

As the winds howl and shriek through the leafless trees, its moanings and wailings denoting that winter is here, it reminds us that about this time the husbandman might naturally expect a few suggestions concerning the care and management of the stock during the winter months, as the farmer's thoughts and attentions are, more than at any other time, turned in the direction of the most economical mode of feeding his cows and other stock. No allusion to this subject, therefore, can fail to be of interest, even if we do not succeed in throwing any new light on the subject. The readers of the *Farmer* know very well that we have many times discussed this subject in these talks, and have repeatedly invited discussion, statements, and opinions of farmers upon it, for the benefit of our readers, but it is a subject of exhaustless interest, and we propose to add a few words more upon it.

Many farmers are apt to suppose that the system of low or insufficient feeeding, so very common in New York, is one of economy, and that they cannot afford to feed any grain or meal, on account of its cost. Many others go still further, and refuse or neglect to supply even their best animals—those on which they rely for their income, in the form of dairy products—with roots or other succulent food, in winter, when they know it will add materially to their productiveness or yield the whole of the succeeding summer. They forget that the true system in feeding cows, especially, would lead us to induce the cow to take as much palatable food as her system is capable of digesting or assimilating.

What is the cow? She is our machine. The food is the raw material for the manufacture of so much milk. Suppose the cotton or woolen manufacturer should neglect to keep up his supply of raw material, or let it run short, so as to run on half time, or below the fair working capacity of his mill, in ordinary or prosperous times, when his goods find a quick and ready market. The farmer's situation is precisely that. He has a cer-

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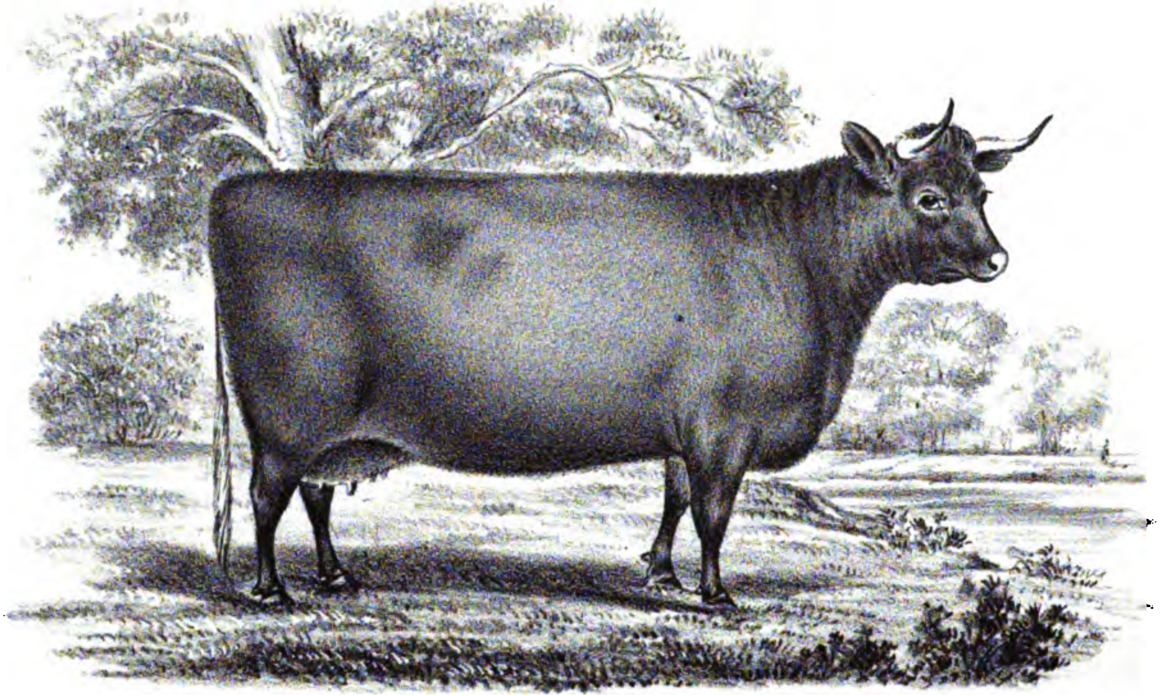


GEORGIANA 4TH

2 Years.

Property of Walter Cole, *Batavia, N.Y.*

Exhibited at Erie, 1877.

tain amount of capital invested in the farm, the buildings, the necessary fixtures and implements of the farm, the stock, &c., and the question with him, is how to get the greatest income from it consistently with its permanent good, or while keeping it up to the starting point. The greatest part of raw material is to be turned into money, and the problem is how to do it with the greatest economy.

To answer the question correctly, it is necessary to know something of the comparative value of the various substances which constitute what may be called the raw material, that is the feeding substance within reach. The most common way of feeding in the country, is to give hay only, and, in very many cases, very poor stuff at that. Not many years ago, it was customary to carry thousands of cattle through the winter on nothing but meadow, or swale hay or straw, and cases were not unfrequent where too little of this coarse fodder, even, was given. As a natural sequence, the stock came out of the barn in the spring poor and emaciated, well nigh reduced to skin and bones. The cattle did well to survive the winter, without gaining anything in flesh or condition. The methods of feeding have improved a great deal within the recollection of the writer, and he is a young man yet.

Now, let us see how the actual comparative cost of a little better system of feeding stands, and see if we are not making a mistake in keeping our cows on dry hay or other kinds of dry fodder alone, with the idea that it is the only cheap way of getting along.

We will take, for example, good English hay as the standard of nutritive value, because that is the most common, and, in fact, the basis of our winter feed, so that all other kinds of feeding substances are good or poor, cheap or dear, as compared with that.

Now we may make whatever allowance we please for any and all inaccuracies in the nutritive equivalents of different feeding substances, as established by careful chemical investigations. They may not be positively and precisely accurate in every particular detail, but, as between each other, they furnish us with the only tolerable comparison we have, and they are probably not far from the truth, anyhow. Let us see, then, how the case stands.

The nutritive equivalent of 100 pounds of good English hay, according to scientific research, would be as follows:

Good linseed meal, ...	22	lbs
Indian meal, ...	25	"
Second quality of hay, say, ...	150	"
Oats straw, ...	200	"
Carrots, ...	200	"
Turnips, ...	400	"

Now, to get a given amount of nourishment out of good English hay, at $20 per ton, would cost, we will say,	$1 00
To get the same from linseed meal, at $60 per ton, the usual price,	44
To get the same from Indian meal, at $40 per ton, would cost,	50
To get the same from turnips, at 30 cents per bushel, or $10 a ton, would cost,	2 00
To get it from carrots, at $20 per ton, would cost the same, or,	2 00

The price of substance may vary a little, according to locality, but any one can easily calculate for himself, by knowing the price in his own neighborhood.

With regard to the roots, if they appear to cost a little more to feed out, and yet the same nutritive substance, we are to credit them with their effect upon the health of the animal, as a frequent change from dry food is beneficial, and so, if it appears to cost a little more to nourish an animal with them, they could not be discarded altogether.

Now, it must be clear that, making all due allowance for any possible inaccuracy there may be in the chemical equivalents, there is still a very considerable margin in favor of a little higher system of feeding the dairy cow, for they will return all we give them, with accrued compound interest.

This paper elicited considerable discussion, turning largely upon "meal feeding."

Mr. E. stated he had slaughtered one of Mr. Miller's yearlings when kept on exclusive meal diet of three pints per day.

He found that the first two stomachs of the animal had not been used at all by the present diet, and were evidently tending toward paralysis, or unfitness for use. He was not prepared to give his approval to this violence to nature, but believed it would eventually result in loss. He believed it would entail an imperfect or degenerated condition of digestive apparatus upon the progeny, and deteriorate the character of the stock. He is trying some experiment with his own herd, and will report the actual results in the spring.

Mr. Fuller urged dairymen to test the utility of exclusive meal feeding on their own herds, and report to the Association.

Mr. Samuel Reeder, of Erie county, and John Fuller pledged themselves to make the test on one or more of their herds, and report.

Mr. T. H. Dunn had believed the theory of Mr. Miller was fallacious, and was pleased to learn that the fact had been shown, by careful investigation, that the cattle subjected to this unnatural treatment would thus become incapacitated for the use of the coarser food, to which we must largely resort, after all, for the subsistence of our stock.

Mr. Doughty, of Meadville, desired to know how we are to keep up the condition of our farms on meal feeding. Where is the manure to come from? The amount of manure possibly made on this diet would be entirely inadequate, and we must resort to artificial manure, or our farms would run down.

John Cole—Mr. Miller does not, by any means, discard the use of coarse fodder, except for a limited time, just while the cows are dry.

Mr. Elsom—If the system is good for a month, it is good for a year, and for constant application.

John Fuller—I believe the present discussion to be premature and superfluous. What do we know of a system we have not tried and will not try? If we would qualify ourselves to discuss this question, we must first make a practical test of its virtues and faults, and then we can speak intelligently. A simple reiteration of our theories and prejudices, based upon nothing, is of no practical value or force as an argument against the practical experience of even one man.

Mr. Elsom stated that he was visiting Mr. Miller's herd every week, and making notes of his observations, which will be placed before the public in due time.

The following committee on nominations was named by the president: William Morse, William Porter, D. H. Gibson, H. Camfield, Mr. Fitz, Samuel Reeder, and John Cole.

The minutes of the last annual meeting were read by the secretary, followed by a statement of the financial condition of the association. The secretary expressed the hope that a spirit of true enterprise may manifest itself at tbe present meeting in the sale of membership tickets sufficient to liquidate the indebtedness of the association.

"MILK SECRETION."

PROFESSOR ARNOLD.

The nature of milk secretion is such that you can spoil it as effectually by feeding impure food or water as by neglecting the milk after it is drawn.

The fact is, milk is often mouldy before you get hold of it.

I have been informed of a case of milk taint traced to a single cow, that was addicted to eating a certain noxious plant. On pulling up the weed and putting it out of the way, the trouble ceased.

A case in St. Lawrence county, New York, was traced to a cow, and by keeping her milk drawn from each teat, separately, it was found that diseased milk from one teat only had created a difficulty with the milk of the entire factory.

I like the idea of holding primary meetings of dairymen. State and county meetings are excellent, but to get at the matter of reform to the best advantage, you must hold neighborhood meetings and confer freely upon all the difficulties that may be encountered.

I had the honor and profit of examining the cheese at the Centennial exhibition. I noticed, in the early exhibits, that three fourths of the cheese was off flavor. Why was this? Because three fourths of the milk was unsound. And if one quarter of the milk could be preserved sound, the other three quarters might have been, by proper treatment of cow and milk.

Every sudden change in the system of the cow causes a perceptible change in the character of the milk secreted. The excitement of the human mother, from any cause, quickly shows itself in the health of the nursing child.

Just so with dumb brutes.

The cow may appear to be a slow, careless creature, yet she is extremely sensitive to fear and other external impressions.

The quality of her milk depends largely upon her condition of physical and mental comfort and enjoyment.

The quantity of food, as well as the quality, affects the character of the milk.

I took milk from a few dairies of cows that were short of pasture, and it took 11¼ pounds to make a pound of cheese. The milk of other dairies that were fed on sowed corn, and well fed, made a pound of cheese from less than eight pounds.

This test was made on the same day, at the same factory.

It must be evident that the amount of feed determines the quality of milk.

If a cow is starved, she can not secrete the same proportion of nutritious elements in her milk.

As the blood becomes impoverished by lack of food, so does the milk.

The cheese-maker loses in these cases by the loss of caseine, which is the cheesey quality.

When the cow is worried, chilled, or out of order in any way, what would otherwise be developed as caseine, is converted into albumen, which is not coagulated by rennet, and not valuable as a cheese element.

The difficulty, however, most to be dreaded, is not the loss of yield, it is in the fact of an unwholesome ferment taking place in the milk, injuring its keeping quality as well as its flavor.

The texture of wool is greatly affected by starving the sheep, and experts in wool dealing can readily detect the fault by the touch.

We want to rid the milk from its odors and ferments, rather than from its heat.

This is most cheaply and effectually done by ample ventilation of the milk cans. Then those dairies that are carted four or five miles, will be in better condition than those that are not carted eighty rods.

Night's and morning's milk can be delivered safely by ventilating the milk thoroughly, and keeping the night's milk in separate cans from the morning's milk.

Animal odor is not, of itself, a ferment, but it always carries the ferment along with it.

Cooling milk checks the increase of the germs of the ferment. Heating it drives the germs out into the atmosphere, or destroys them.

The effect of thunder, is to hasten all the changes that take place in milk.

The electric effect is greater when the thunder cloud is at a considerable distance than when directly overhead, for this reason, it is the nature of electricity in one object to repel electricity in another, and render it negative.

When a cloud, heavily charged passes over the earth, the electricity of the earth is, as it were, driven to the other side of the earth, so that the surface beneath the cloud becomes charged negatively, inviting the lightning from the cloud to the earth. The falling rain drops also convey much electricity with them, thus weakening the negativeness of the locality; and these facts seem to modify the destructive effect of the fluid upon milk under a passing cloud, while at a distance, the negative condition being intense, the milk will sour more quickly.

By boiling milk every day, you may preserve it almost indefinitely, because you thereby destroy, as it were, each crop of germs as soon as they germinate, and before they have a chance to do their work of destruction. But if, after boiling, it is permitted to cool down, it will receive germs from the air that will destroy it.

The arrival of the dinner hour made it necessary to postpone the remainder of Professor Arnold's remarks till the afternoon session. It is further proper to state, that the apparently disconnected character of his remarks was the result of his answering questions put to him by many members, upon various points, not always relevant to the topic under consideration.

THURSDAY, P. M.

Professor Arnold—"Handling of Curds." I will commence with the milk when ready for the rennet, and premising that to this point everything has been done as it should be, and the milk is in good condition.

Much of the cheese made is damaged by using impure or bad rennet, which injures its flavor, as well as texture.

We notice these defects in many of the cheese shown at the Centennial.

To make a pure flavored cheese, you must have a sweet and healthy rennet, well preserved.

Some years since, I discovered a process for extracting rennet, rendering it perfectly pure and of uniform strength.

I have recently entered into an arrangement with Professor Caldwell, of Cornell, to engage extensively in making and placing it on the market.

A similar preparation was exhibited at the Centennial, from Copenhagen, one pound of which would coagulate 10,000 pounds of milk, is perfectly pure, and of uniform strength.

I notice that dairymen are now using about twice the amount of rennet that was used in former years.

The true method of applying rennet is to preserve the temperature of the milk uniformly during the progress of coagulation. Fluctuation of temperature causes it to coagulate imperfectly.

Cut your curd fine, and heat with the greatest possible uniformity at every point.

I must say a word about ferments, which, though they are often not discernible at the beginning, will develop very rapidly, during the heating or curing process in the curd vat.

To avoid this, as far as possible, and preserve the flavor of the curds, draw the whey as early as possible.

You thus remove the largest proportion of the taints or germs of ferment which are afloat in the whey.

The Cheddar process is valuable, chiefly from this fact, that it removes the whey early, and allows the curd to pack, thus necessitating the grinding process, which is often misnamed cheddaring.

I hope you will try the experiment carefully, and if you do not prove the truth of my statement, I will come here sometime, and submit to any abuse you may see fit to heap upon me.

By this process, also, you may, if you wish, put your curd further in advance in an hour than in several hours by the common method.

You may, if you please, use a far greater degree of acidity with perfect safety, and the perfect preservation of flavor.

Ordinarily, the whey is allowed to eat up the rosy flavor which gives cheese its very desirable character.

The grinding of curds has no effect whatever on the character, except as by more complete exposure to the air it becomes oxydized, and this change in its chemical character is often of great benefit in case of taints or sour curds.

CURING.

We are very much at fault in the curing of cheese, and especially in the construction of curing-rooms. No room which permits the frequent and sudden changes of weather to effect the cheese, is fit for the purpose of curing cheese. The uniform temperature of 70 degrees is the nearest right. Every room should have a space between close walls for dead air.

Plastered walls are not close enough, neither is wood. Line your building with paper, and you have a perfect dead air space, which will protect your room most effectually from the external changes. These frequent changes must be avoided, if we would obtain a perfect flavor in cheese.

A factory man in Canada, who last year had a very poor curing-room and poor cheese, remodeled his room this year, and sheathed it with paper. The past season he has received first prizes for his product not only, but has also carried off an award at the Centennial.

Tarred paper is not as good as building paper. The smell is liable to taint the cheese, and it is not as perfect a non-conductor as paper.

Mr. Elson—I have been told that lining a room with tarred roofing paper would not only protect it from heat and cold, but that rats would never trouble the cheese.

Prof. Arnold—Perhaps not, but we don't want anything about our cheese that smells so bad that rats will run away from it. Such odors will taint the cheese. We should aim to keep the cheese room as free from every unpleasant smell as possible.

RISING CREAM.

It is a fact, no doubt, that the fat in milk expands more readily than the liquid portion of the milk by the application of heat.

Fat is not a good conductor of heat, while milk is a better conductor than water.

Therefore, while heat is being applied, the liquid portion receiving the heat most readily is affected to expansion most readily, and the specific gravity of the fat and milk is so nearly the same that cream does not rise, but, by reversing the process, taking the milk while warm and applying cold, the liquid portion cools first and shrinks first, thus keeping cream most expanded, and it, therefore, rises rapidly. This is the philosophic reason why cream rises fastest at the falling temperature.

Cream risen at a low temperature contains more water, and also more caseine, than that risen at a higher temperature.

It was stated by Mr. Peters, of New York, at the New York State Convention, recently, that a large portion of the State creamery butter that he had tested the past season contained so much water that when the trier was drawn, the hole immediately filled with brine, and, on replacing the plug, the brine would spurt up in his face.

This amount of water in butter is objectionable.

Such butter will not stand up well in warm weather.

George Thomas—Why is it that we are not able to sell our butter and cheese as high as the same qualities sell for further east?

Prof. Arnold—This is partly owing to the prejudice that exists against your locality, and partly because you do not take pains to inform yourselves as you should in regard to market values; but must organize boards of trade, and use every means to keep up with the times.

You must insist on branding your best goods with the name of your own State, and, after a time, dealers will learn to call for Pennsylvania cheese, as they now prefer New York State. At present they do not like either the looks or the sound of Pennsylvania. It savors of the character of your goods.

If you would do away with these evils, it must be by improving the quality of your butter and cheese, by raising your standard of excellence, and by learning how to obtain full market value for your goods.

REPORT ON CENTENNIAL DISPLAY OF CHEESE BY NORTH-WESTERN PENNSYLVANIA.

J. M. BIGGER.

The centennial committee, appointed at a meeting of the association, held in Conneautville, in June, 1875, increased by a joint committee, appointed by the board of trade, received a donation of two cheeses each, from the following factories: H. McGuire, S. Breckenridge, John Cole, W. N. Gilbert, T. Cochran, John Fuller, I. G. Hall, William Porter, A. E. Harper, D. H. Nodine, Clipper Factory, A. M. Fuller, A. S. Beatty, and John Brown Factory, the avails of which were to be used for the purpose of securing an exhibit of cheese from north-western Pennsylvania, at the

Centennial. The committee proposed to take $350 00 in Centennial stock, and make a continuous exhibit of cheese during the season. Accordingly that sum was placed in the hands of ex-Governor Seymour, for the purpose above named, subject, however, to the order of the committee. The committee, from the best information they could get, found that contention, a want of good management, and lack of harmony of action prevailed with the "National Dairy Centennial Committee, which, in their judgment, rendered it unwise to take any Centennial stock. The ex-Governor was addressed on the subject, and he refunded to the committee the $350 00. Your committee then, seeing no safe plan to work upon, abandoned the idea of the cheese interests of this section being represented at our great national exhibition. Then to the quality of our cheese, until late in the season, however, the quality improved, and at the eleventh hour, Mr. H. C. Greene, and myself, talked the matter over, and concluded if your committee would guarantee us against loss to the extent of $100 00 (about one half the fund in their hands,) we would take upon ourselves the responsibility of representing the cheese interests of northwestern Pennsylvania, at the Centennial, by purchasing five or ten cheese from each factory, and give them (the factories) the full benefits of the awards, and advantages arising from the exhibit. We paid the contributors to the Centennial fund full price, and those that *had not* contributed two cheese, ten cents per pound. We gave all an invitation to exhibit. We visited all the factories time would allow, and aided in selecting the cheese; those we could not visit we wrote to. We got the promise of about one hundred and twenty boxes cheese; of that number, eighty-five boxes were shipped by the following factories:

	Boxes.		Boxes.
WILLIAM PORTER,	10	CAMBRIDGE,	5
NEW YORK FACTORY,	5	WEST UNION,	5
A. E. HARPER,	5	ROCKDALE,	5
H. McGUIRE,	5	JOHN FULLER,	5
J. G. HOLEMAN,	10	JOHN COLE,	10
A. J. PHELPS,	5	CLIPPER FACTORY,	5
SPRING FACTORY,	5	WILLIAM NASH,	5

Of the fourteen lots, three lots were recommendend by the judges for awards. J. G. Holeman's best, marked 95 per cent. of perfection, or only 5 points less than perfection; which means splendid cheese.

William Nash, (second,) marked 90 per cent. of perfection.

John Cole, (third,) marked 88 per cent. of perfection.

The average of the lots exhibited, were 83¼ per cent. of perfection.

We regret the cheese from the factories of Messrs. John Fuller, William Porter, Caleb Shreve, and G. W. Carroll, did not get there in time to be judged; they were all fine cheese, and would have done great credit to the exhibit. The total cost of the cheese, including expenses of exhibiting, &c., $790 43. Total net receipts for the same, $648 40. Deficiency, $142 03, of which your committee paid $98 25, as per agreement, from the funds in their hands, which enabled them to pay back to the contributors, 50 per cent. of their contribution, or the price of one cheese. It will be seen, by the above arrangement, that those factories that received but 10 cents per pound, contributed the difference between 10 cents and full price, which, on five cheese, would amount to about the price of one, and thus the contribution was made equal.

In making the selection, we found the quality of the cheese at the different factories very good—a marked improvement over the summer make, and, with the exceptions of a want of proper curing, and not made quite close enough in a good many of the factories, the quality was fine. The cheese on the shelf in the Centennial dairy building made a fine display, and compared very favorable with the cheese from other States and Canada. We had the pleasure of showing them to many buyers and dealers. All expressed themselves as highly pleased with the style and quality, and were surprised to hear of the magnitude of the business here. It was a great advertisement for our cheese, and we trust no one will ever regret having made the exhibit, when they take into account that our exhibit, on a general average, stood, in point of perfection, ahead of the United States; ahead of Herkimer county, New York, the greatest cheese county in the United States, and that only one lot in the United States stood higher, and that only one per cent.

At the close of this report, three rousing cheers were given for the success of Pennsylvania cheese.

ADDRESS BY L. C. MAGAW.

I am not surprised that you, as dairymen, are somewhat discouraged. The times are truly discouraging, and prices have ruled low. Yet in the light of the present omens before me, you have great reason to be encouraged.

When we look back to this country, to this village of Cambridge, as it was thirty years ago, when you had no bridge over French creek, but crossed by ferry boat because bridges were too expensive; when the mail was carried by a messenger on horseback; when we see the situation as it was, and now see it as it is, do we find no reason for encouragement?

I well remember a wild prophecy of one of our old citizens, who, meeting another on the Diamond, in Meadville, said to him: "My friend, there are brighter days in store for us, sure. Why, sir, the day is coming, and

I can see it, when the mail of Meadville, that is now carried on horseback, will be brought to us by a large coach and four horses, sir."

Well, my friends, you and I have seen the big stage with four horses; we heard the driver blow his horn; we have seen him, also, as well as the saddle-bags, pass out of date, and now how do we get our mails? In this is there nothing to give us courage?

In the eastern portion of our county, large quantities of oil are produced. You and I remember when petroleum in Crawford county was not known. Now when a man wants oil, he just bores a hole, puts in a pump, and up comes crude oil, by the hundred and thousand barrels.

What has wrought this change? Combined business energy.

Now where should this oil be refined and prepared for the world's markets? You say on the spot where it is produced, of course. Not so. It must be transported one hundred and fifty miles, with all its waste and offal, there to be refined. Why? Because a few men of energy have said: "Now we will take hold of this refining business and make it a business, and then we will combine to control it, and keep control of it. We will buy up other establishments, tear them down, and, by every means, we will make Cleveland the great oil refinery of the world." And they have done it.

I go to Boston, Lynn, Salem, and other manufacturing towns of New England, and find them engaged in manufacturing leather, boots, and shoes, and I ask them, "Where do these hides come from?" "From New York, Pennsylvania, and other States."

"Where do you sell your boots, shoes, and other wares?"

"All over the United States. We have some good customers in your little city of Meadville."

"What better facilities have you for making these goods than we have, who buy them and wear them?"

"We have none that you have not, but we have undertaken to carry on this business, and mean to stick to it and control it, and we shall do it."

All over our country we find these results of business success being wrought out by nothing else than simple, indomitable, persevering, industrious energy, applied to a particular branch of business—an energy that will take up with nothing short of success.

Now, what have you done as dairymen?

Have you won no success? Have you made no progress? Have you reason to-day to be disheartened, and say, "We cannot succeed?"

The transactions of the present convention show what you have done.

If idleness has its reward, so has industry. And the present advantages are the reward of your industry. You have wrought this change with your own hands and your own brains.

You have done it, and the energy you have displayed thus far will, if persisted in, insure far greater success in future.

Let me tell you, you must learn to know the exact value of your goods. You must learn to know, not only their good qualities, but also their faults, and how to avoid them.

This is the grand secret of success, after all, to learn how to avoid the faults.

You must learn to know, not only the exact quality of your goods, but their market value.

By some means, by any means, by all means, you must be able to place a correct estimate of value upon your goods to the buyer. You must know it as well as he does.

Neither ask too much nor too little, but when you have cheese to sell, and the buyers call on you, do not ask ten cents, and then grumble that they did not pay you eleven.

Buyers will pay for goods just what they are worth. They will not pay more, but you might possibly induce them to buy at less than value if you do not know what to ask.

Go on, my friends, in the direction you are now taking, sustain and encourage these organizations by which you are encouraged to thrive, by every means at your command, strive to search out the better way and walk in it, and when you and I shall have passed away, and our boys shall have taken upon themselves the labors that we are now endeavoring to perform, and this time is soon coming, let them realize that the yoke that often seemed heavy on our necks, has been made to rest more easily on theirs, by the faithfulness with which we have employed the best energies which God has given us to improve our own condition and theirs.

THURSDAY MORNING SESSION.

John Cole spoke about "The Standard of Crawford County Cheese." He said the largest dairies produced the best quality of milk. As a rule we have obtained good prices for our goods; but we ought not to be satisfied with the past, but improve in future. Certain practices that have been indulged in, more or less, are destructive to our interests, and ought to be discountenanced by all, as they are by the best dairymen. Untidiness in the treatment of dairy utensils, is a fault altogether too common with our patrons. We must give more attention to these things, or we cannot hope to keep up our reputation in competition with those who are more careful. Saving strippings, partial skimmings, &c., belong to the same category of forbidden practices. How many of our patrons are guilty of these practices is not for me to say, bnt they have been done quite too often in the past, and may be hereafter, but we *must* learn to deal honestly with our neighbors, and with our cheese as well as with ourselves, if we would prosper.

S. P. Reeder—Where do we get our money? If we get it from our dairies, let us look well to our dairies; let us look well to this source of profit. Let us look closely into these matters—into all the details—and, if possible, secure the greatest amount of profit from our business. We need have no fear of overproduction, if we watch our interests closely, and strive constantly to improve our product.

William Nash—I indorse the words of the last speaker in full.

Every patron should bring himself to feel "the success of the factory depends upon me," act accordingly with scrupulous honesty and carefulness.

George Spidler—Is it not the business of the cheese-maker to reject all poor milk? And should we not hold them responsible for receiving poor milk?

Mr. Cole—If we were to reject all the milk we find not exactly right, in hot weather, we should have to reject it about all.

On the other hand, if we receive milk that is not just right, we may find it worse than we thought, and bring loss upon us. We do not know enough about milk yet to enable us to judge of its character when received.

A gentleman was sorry to understand Mr. Cole to say that dairymen knew more about their milk than factory men themselves.

Mr. Cole—I desire only to say that the dairyman knows whether he has given his milk proper care better than any one else. Milk may be bad when it does not actually stink, and neither really tainted, nor is really sour, but not in a sound condition.

Mr. Hotchkiss had known many instances of these faults that were not within his powers of detection, while the results proved the milk to have been in a very imperfect condition.

John Cole—I believe the evils complained of are more the result of ignorance than of willful neglect. The wisest of us do not know enough about milk to enable us to read its real character with accuracy.

G. W. Carroll—I fear we are not going to reach the ears of our patrons by these discussions. I do not see a single man of my patrons here. These are the men we want to reach, and we must reach them by some means or all our talk is in vain. At present I see but one way to reach them, if they will not come out to these meetings, and that is by letting them suffer the penalty of their own neglect.

I propose, hereafter, to inspect the milk offered at my factory closely, and send a tab back with every can of poor milk. I shall write mild words at first, but if the fault is repeated, the tabs shall grow worse and worse, till the milk begins to grow better or stops coming.

J. G. Holeman—One of the worse faults, under my observation, is rusty cans, cans that are really unfit to use, because the tin is off, and they will rust and become tainted and taint the milk.

Hiram Canfield—I feel called upon to say a few words on the financial condition of this society.

The indebtedness of this association should be wiped out at once. It is not large, but yet it should not be allowed to run till the close of this meeting. We ought to, and I believe we will, before the close of this session, wipe it out entirely.

The executive committee provides us with the best the country affords, and if we refuse to pay the slight cost of these meetings, and other expenses of the society, we prove ourselves ungrateful.

Stock Raising as Relating to Dairying.

Honorable Eastburn Reeder—How is gilt edge butter, or butter of the finest quality, to be made?

By observing these four essential conditions:

1st. Good cows; 2d. Good food; these secure to us good milk. 3d. Good care in its management; 4th. Suitable dairy buildings and appliances.

I will first consider the cows which are to compose the dairy, and this includes the question of stock raising and selecting, as relating to dairying, the first topic upon which I have been requested to speak.

I hold that no man can purchase a lot of cows, indiscriminately, and be sure of making a first quality of butter from them, no matter how much care and skill he may bestow upon them afterward. Cows for the butter dairy must be selected, and, in doing this, we will find some good animals in all the different breeds; but some breeds will possess them more generally and more uniformly than others. Doctor Sturdevant, whom I regard as a careful experimenter, says that "The production of butter is largely dependent upon breed." The same is true of the production of beef or milk. Men keep neat cattle for the production of beef or milk; and from milk both butter and cheese are manufactured. According, as our object be the production of milk, beef, butter, or cheese, should we be governed in the selection of our animals. And for the production of these four great staple products, I would not, in making my selections, go outside of three distinct and clearly defined pure breeds, and they are: The Short Horns, the Alderneys, (including both Jerseys and Guernseys,) and the Ayrshires. These three breeds are destined, in my judgment, in time to root out and supplant all others.

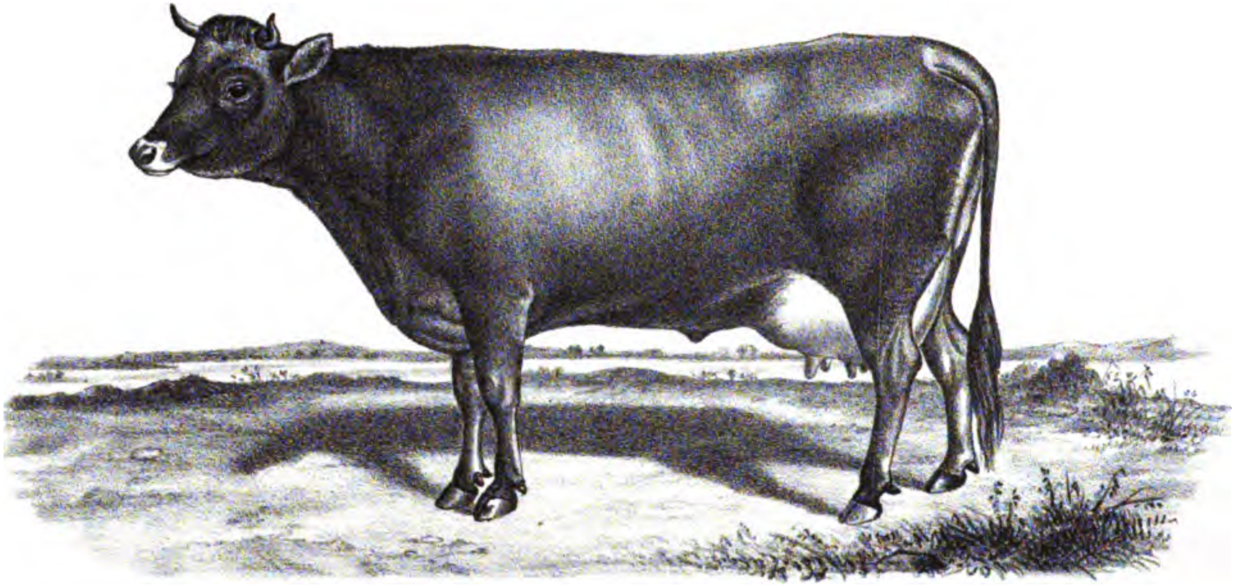
For the production of beef, the Short Horn has no rival. The milking tendency, which is antagonistic to the formation of fat and flesh has been so thoroughly and effectually bred out of our prize winning and highest priced Short Horns, that they will not now yield milk enough to rear their own offspring, and foster mothers are employed to bring up the young nobility.

For the production of milk in large quantity from a given amount of food consumed, the Aryshire cow has no equal. In localities where it is desirable to sell milk by the quart, I would keep Aryshire cows. By some writers, the milk of the Aryshire cow is described as being rich in caseine, and this adapts her for the cheese dairy.

For the production of butter, I would select from the Alderneys, of either the Jersey or Guernsey breeds. These breeds are fast coming to be recognized to be the best for butter-making. I have found, by trial, that a pound of butter can be made from eight to twelve quarts of milk of the Jersey and Guernsey cow; while from the milk yielded by other breeds, the quantity of milk required to make a pound of butter has ranged from twelve to sixteen quarts. The reason of this is a physiological one. These breeds of cattle are so constituted by nature, that their milk secretions contain a much larger percentage of butter than does the milk of other breeds. In selecting the cow for dairy purposes, whether it be for milk or butter, the first principle to be observed is that she should possess a feminine appearance. Nature has provided a male and a female form for all animals. These distinctions of sex are much more strongly marked in some classes of animals than in others; and in the bovine race these distinctions of sex are as clearly defined, and as strongly marked, as in any class of animals that I can call to mind. Writers, in describing the model dairy cow, say her head should be small, but rather long; her neck and shoulders light; but the body, containing the vital and digestive organs, should be capacious; she should be both wide and deep in the hind quarter. An animal of this described form presents what is familiarly termed a wedge shaped appearance. The dairy cow, at best, is but a living machine to convert food into milk, and the larger and more vigorous the digestive organs, the better for securing this result. But all large milkers are not necessarily good butter cows. In selecting the cows for our butter dairies, we must go a step further than securing the most approved forms. We want a criterion by which to judge of the quality of the milk they will yield, as well as of its quantity. This criterion is found, so far as my own observation has extended, in the color of the skin. A cow to make gilt-edged, or golden hued butter, should possess a rich yellow skin. This can be seen best inside the ears, on the rear portion of the udder, around the base of the tail, and where white marks occur on the body, particularly upon the shoulder, or dewlap. The color of the horn is also very frequently an index to the color of the skin, and the quality of the milk.

Having occasion quite recently to purchase a cake of tallow, I was struck with the differences in color which the different samples presented that were offered for my examination. They ranged all the way from the white color of lard to the yellow color of butter. And yet all the samples had been prepared, or rendered exactly alike. The difference was natural to the animals from which they had been taken. The color of the fat of an animal denotes the color of butter she will produce to a great degree, for the butter is merely the fat contained in milk.

I have said that making yellow butter is a natural characteristic of the Alderney breeds of cattle. I will now go a few steps further, and say that it not only excels in the point of color, but that it is also superior in solidity, smell, and taste. These qualities give it an enhanced market value. So much so, that Alderney butter commands in our markets, from fifteen to twenty-five cents per pound more than other grades. The precise reason why Alderney butter has been judged, by experts, to be superior, in smell and taste, to that produced from other breeds, it will, perhaps, be rather difficult for me to demonstrate. Butter has been found, by scientific men, who have analyzed it, to contain essential oils, which give it its peculiar aromatic spicy taste. These essential oils, doubtless, exist in larger quantity, or stronger quality, in the butter of different cows, and of different breeds. Let me give one fact that came under my observation a few days ago, that I think has a bearing upon this question. At that time I owned a cow, that had been imported from the island of Jersey. There was no doubt of its purity of blood. She had become incapacitated from being no longer valuable for dairy or breeding purposes, partly from age, and partly from an accident, that I prepared and consigned her to the shambles. The rendered tallow obtained was the richest in color I ever saw, while the quality of the beef was the best we ever had tasted. It had a peculiar, aromatic, spicy taste, such as no other beef possessed we had eaten, either before or since. This peculiarity of taste was observed and testified to by three other families, who had portions of it, besides my own—indeed by all who had an opportunity of tasting it. So that while the Alderney cannot be recommended as a beef producer in point of quantity, the quality is of the highest order. The reason for this I ascribe to be constitutional—natural. Another distinguishing peculiarity of the Alderney cow is, uniformity of product for the entire year. Cows of other breeds are frequently met with that will produce more butter for short periods, but taken for the whole year, the Alderney will be found to be hard to surpass. Cases of extraordinary yields are also quite as frequent with this breed as any other. Of this let a single case suffice. The imported Jersey cow, "Niobe," herd register number 99, owned by Samuel J. Sharpless, of Philadelphia, yielded from grass alone, twenty quarts of



Jersey Cow "PRIDE OF THE FARM" 4702, 3 Years.

Owned by James Young, Middletown, Pa.

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milk per day, making two pounds of butter. This is requiring ten quarts of milk to make a pound of butter, and making fourteen pounds of butter a week. This cow is now eighteen years old, still hearty and vigorous, and was examined by a committee of competent judges, and tested by an impartial scale of points, and was awarded the highest premium at our late Centennial Exhibition, where competition was open to all the world. Not only was the first premium on cows awarded to an old and imported animal, but also the second premium went in the same direction; the same was also true of cows, who were the stoutest competitors for those honors. This certainly shows to us, unmistakably, that we have been making no progress in breeding, in the right direction. One of the lessons taught us by the late Centennial Exhibition, is the mistake that too many Jersey breeders have made of sacrificing utility for beauty,—not only in this country, but upon the island. A perfectly developed feminine form, indicating large yields in milk, a rich golden skin, insuring milk of the richest quality in butter, have been sacrificed for solid colors, and fancy points or markings, which have no real ability connected with them; but merely add to the beauty of the animal, in the general or fashionable estimation of mankind. But, to my mind, the best cow is the most beautiful.

Having now described, as well as I have been able, how to select a cow for the dairy, our next question will be how to produce them. This opens to our views the whole question of the principles of breeding—a field of itself, ample for an entire lecture. I can only state a few general principles, and the most important of these I consider to be the well established law that "like produces like." So far, we have only considered the selection of cows for the dairy. The selection and use of dairy bulls is, at least of equal, and I do not know but what it is of even more importance. First-class cows of even native, or grade stock, cannot at once be secured by all dairymen, for the simple reason that they do not now exist in sufficient numbers. They must, therefore, be produced. It is a matter of necessity for us to take the stock of the country as it is, and undertake its improvement. As the selection of our bulls used is good, or bad, so will our breeding be up or down. We can improve our stock on hand by good selections; we can still further deteriorate it by bad selections. Cows for the butter dairy, as a general rule, will have to be bred, they cannot now be selected. If the dairymen of this State would carefully breed their cows for the next ten years, instead of continuing in the purchase and use of the cast-off and discarded animals of other districts, a degree of improvement would be reached, surprising to them. For the base of operations, the common native and grade stock of the country must be taken, and these should be bred to thoroughbred bulls, for the following reasons:

First.—Experience has shown that the common, or grade bull, cannot be relied upon to transmit desirable qualities with any degree of certainty.

Second.—The thoroughbred bull of each distinct and pure breed, has a certain well established and fixed type of character, and is far more sure to transmit desirable qualities to his offspring.

The French mark, or Guenon system, as it is termed from its originator, is strongly relied upon by many in selecting their dairy animals of both sexes. I would place greater reliance, if the quality I desired to perpetuate and increase had existed in the ancestors on both sides for several generations back, than I would upon any particular curl, or direction in the the growth of the hair. Large digestive organs, large veins, a loose, mellow skin of the golden hue, fine silken hair; these are better indications for me of good dairy stock than any, or all the discoveries made public by Guenon without them.

Professor Wetherell, whom I had the pleasure of hearing last winter, before the American Dairymen's convention, at Rome, New York, stated that breeding from a cow and bull of similar type, the quality desired to be perpetuated will be increased or intensified. He put the case thus:

"Take a bull of any given breed, and represent his hereditary power by 100; breed this bull to a cow of different hereditary power, say to 60, the offspring would be reduced to 100—60,=to 40. Now, suppose this offspring to be a bull, although both sire and offspring may appear equally perfect in form and general character, the power of hereditary transmission being as much greater in the first sire as the proportion of 100 to 40; hence the former would be, and is, much the more valuable animal for breeding purposes than the latter. By thus breeding animals of similar type, the offspring will be more likely to possess the same characteristics, with a greater power of hereditary transmission of these characteristics, while, on the other hand, animals of opposite characters mutually weaken each other's influence, and the offspring possesses the power of hereditary transmission in a reduced degree."

This, Professor Arnold, another high authority, says is "a clear and compact statement of the law by which the tendency to strengthen hereditary transmission is increased by breeding together animals of similar type, and the reduction of the power of this hereditary transmission by joining together animals of opposite natures."

Professor Wetherell, in his address at Rome, also confirmed other points I have before stated, and noticed in my own experience, when he made the statement, that "cows that give rich milk, when fattened, make particularly rich beef," and that "the sole office of the Jersey cow was to produce a large amount of rich, highly colored cream," and which, I might add, is indispensable in securing a large amount of gilt-edged butter.

In conversation, some time ago, with a celebrated breeder of Jersey cattle, and to whom was awarded the premium for the best herd of Jersey cattle, consisting of one bull and four cows, at the late Centennial exhibition, he expressed the opinion, "that one truly good bull calf is intrinsically worth half a dozen heifer calves." This idea is directly the reverse of the common opinion, but I believe he is right. His theory is that the bull stamps his mother's qualities, good or bad, upon the heifer calves of his get. No great results in breeding can be said to be fully accomplished, or fairly established, in less than a lifetime. We shall await the results of this gentleman's experiments with interest.

The scale of points, adopted by the American Jersey Cattle Club, as its standard, by which to judge their animals, gives to the color of the hide, where the hair is, white; on udder, and inside of ears, yellow—5 counts in a scale of 100 points, while to the "escutcheon," or Guenon mark, which should be "high and broad, and full on thighs," 8 counts in the same scale; thus, in my opinion, attaching more significance to a fanciful and arbitrary sign, than to the true criterion in judging of quality.

In this judgment, I am sustained by Doctor Twaddell, of Philadelphia, who has examined many cows in this country and upon the island of Jersey, and who has had many years of experience, and was one of the judges of Jersey cattle at the Centennial exhibition. In his opinion, the color of the hide is of the first and primary importance; and he found animals coming up to the required standard, in this particular, quite as scarce upon the island of Jersey as in this country.

STOCK FEEDING AS RELATED TO DAIRYING.

The second condition which I named, at starting, as being necessary for making gilt-edged butter, was good food. No matter how good or perfect the cows may be in themselves, if they are not supplied with good food, in proper quantity, and at proper times, good butter will not be realized. We must make a good selection of our dairy farm; that is second only in importance to that of our dairy stock. The true nature and composition of soils can only be accurately determined by chemical analysis; but there are other methods of judging, which every one can employ, by which a good judgment of the nature of soils can be obtained. The soil of the dairy farm should be one adapted to the natural grasses, insuring good pasture and good crops of hay. Plenty of grass in summer and hay in winter, are the two great staple articles for making milk and butter. The soil should also be suited to the raising of good crops of corn and wheat, as they enter largely into the production of milk and butter, particularly through the winter months. The subject of the proper rotation of crops is one that has been much discussed, each one having his favorite theory.

The six year rotation is the one I have considered best adapted to dairy farming, when we take all things into consideration. This plan keeps one half the farm in sod all the time, thus affording plenty of grass for pasture, and to cut for hay. Each field upon the farm remains in sod three years, and is under cultivation for the same period. Permanent pastures are better adapted to fattening stock, and, unless the soil is especially adapted to them, they are not advantageous, as so many of the grasses fail, after a period of three years, from various causes, that they will again require re-seeding. The rotation of crops, which I have followed, is: 1st year, Corn; 2d. Oats; 3d. Wheat. This keeps the field under cultivation three years. When it is put in with wheat it is seeded down to grass, both clover and timothy, remaining in sod the fourth, fifth, and sixth years. During this period it is mown twice, and pastured once—generally the last year, as it then contains a greater percentage of the natural grasses and affords more variety. Cattle like change of food. The oat crop, in my opinion, is not an essential one in dairy farming, but has been cultivated more to fill up the rotation, and to prepare the land for wheat and seeding down to grass. Where the oat crop fails, the cultivation of roots may be profitably substituted, and even where it succeeds well, two or three acres, producing as many hundred bushels of roots, may generally be raised with profit. Corn will be wanted, in large quantity, for feeding the cows during the winter. It is an important element in making good butter during this season of the year. Wheat bran, mixed with corn meal, in equal proportions by measure, promotes the health of the animal, increases the flow of milk, and consequently the amount of butter. In the winter I feed my fresh cows from 3 to 6 pounds of corn meal, and from 2 to 4 pounds of wheat bran at a feed, morning and evening—making from 5 to 10 pounds of the mixture at each feed—together with as much good hay as they will eat. At noon we give them a bundle of corn fodder, or a bunch of straw. It is stated, somewhere, that an animal will consume, daily, 3 per cent. of its live weight, when fed on good hay, or its equivalent. This, for a cow whose live weight is 1,200 pounds, will be 36 pounds of hay; for a cow weighing 800 pounds, 24 pounds, &c. I find that by feeding my cows from 10 to 15 pounds of grain a day, they do not require more than one half as much hay, besides making a better article of butter.

For fall feeding, before severe freezing weather sets in, pumpkins, fed to the cows, help out the failing pastures, and furnish an excellent quality of butter. For winter feeding, the yellow rutabaga is most easily raised, and gives to the butter an improved color. These can be easily kept until spring. In the spring, for early pasture, the field to be planted with corn, and a few acres of meadow, will enable the dairyman to furnish his customers with grass butter by the middle of April, or the 1st of May, according to the forwardness of the season. An acre of sowed corn is a good thing to have, particularly, if pastures be overstocked, or the supply cut short by drought. The soiling system is advocated and practiced by many, and there is no doubt but that more stock can be kept upon a given number of acres, but it adds greatly to the labor in taking care of the stock, and if the animals are closely confined, contributes nothing toward cleanliness, which is one of the essential points in good butter-making.

WATER.

The necessity of having, at all times, a full supply of pure water, needs but to be mentioned to be at once recognized and admitted. Water, if not contained in or supplied to every field, should be of convenient access. Cattle having to go a great distance for water, labor under great disadvantage. That dairy farm is highly favored which has a good spring in each field, or a stream flowing through the central part of the farm, where it may be conveniently reached from all the different fields. Cattle often suffer greatly when confined in inclosures destitute of water. In such cases they are let out to water at stated periods, without much regard to their wants or necessities. As milk is very nearly nine tenths water, its full supply is obviously necessary. Cut short the supply of water, and the flow of milk fails rapidly. Cows giving large quanties of milk will require more water than those giving small yields, or than dry cattle. When water is not of convenient access, cows will suffer from thirst before going to obtain it, and when obtained, take it in excessive quantities. During the winter season, water should be supplied in the barn-yard, either by the well, cistern, or flowing stream, thereby saving manure, and protecting the cow from exposure to cold winds and storms, and the danger of injuries likely to be received in traveling over icy roads for water. The saving in manure alone will soon pay for the cost of a cistern, and this, with the possible loss of a valuable animal from a fall on the ice, are sufficient reasons for providing a supply of water in the barn-yard. Water is second in importance only to feed.

SHADE IN PASTURES.

The arguments for and against providing shade in or near to pastures, have been duly made and considered. The suggestions of humanity recommend, the considerations of sound policy approve them. Both the humane and the politic man hath considerations for his beast. The arguments against shade are:

First. Cattle spend time unprofitably under them, when they should be grazing.

Second. The manure is not so evenly distributed over the field.

The first argument has no real force. Cattle should not be all the time eating. They are so constituted by nature, that a considerable portion of time is required for a remastication and digestion of food taken into the stomach. This can best be effected in a state of quietude and repose, and a cool, shady grove is an inviting place for its accomplishment. There is really no loss of time spent here; all the functions of the animal economy are going on under more favorable conditions. In times of great scarcity of pasture, I have observed that cows will do about as well if permitted to graze but two hours, morning and evening, as when suffered to run in the field the entire day.

The second argument against shade in pastures, the only one which has any foundation, may be remedied by providing temporary movable shades, or, what is equally well and more practicable, by removing and distributing the manure collected to such places where it is most needed. In order to get the fullest returns from our cows, their comfort and health must be provided for, and this is better secured by offering places of retirement and rest, at suitable seasons, than by compelling the conditions, gorging and exercise, and enforcing the endurance of oppressive heat during the entire day. To sum up this question of the proper food for making gilt-edged butter, I would say that plenty of good grass and pure water are all that are necessary during the twenty-six weeks which usually comprises the length of the pasture season in our State. During the remaining twenty-six weeks of the year, which includes the feeding season, I would say good hay, made from early cut grass, corn-meal, and wheat bran, with an occasional feed of pumpkins, potatoes, or roots of some kind. These, together with good water, are about all that food can contribute toward producing the desired article of gilt-edged butter.

Before leaving this branch of the question, I will give my plan of raising and feeding dairy stock. In fact the two questions are so intimately connected and blended with each other that I scarcely know where one ends and the other begins.

As soon as the calf is able to stand and has sucked the cow once, I separate them. It is less trouble to teach it to drink, and the cow will fret less from its loss than if suffered to remain with her a longer time. I milk the cow and feed the calf from its mother's milk, from two to four quarts, morning and evening, according as it will take it. When the calf is a month old, I set the milk for cream, being no longer particular to feed the calf its mother's milk; skim it after standing 24 hours, and warm it to about 90° or 96°, when the skimmed milk is fed to the calf. This enables me to get the most and the best of the butter and milk contained. To take the place of the impoverished milk, I place some wheat bran, locks of fine hay, and soft straw, where the calf can get at them, for at this age it will begin to eat solid food. The skimmed milk is fed until the calf is about three months old, when it is gradually substituted by thick sour milk. During the winter, the sour milk is both thinned and warmed by adding a quart of hot water and stirring up well. When the calf is six months old, the feeding of milk is discontinued. If the calf has been raised during the winter, it is now ready to turn to pasture in the spring. If, however, it has been raised during the summer season, and comes its winter quarters in the fall at six months old, it should be fed fine hay and two quarts of wheat bran, morning and evening; these will keep it in a growing condition all winter. I have seen calves lighter in the spring of the year at ten months and a year old than they were six months previous. It is a great mistake to suffer a young animal to stop growing. If the calf is healthy and vigorous at one year old, it will take good care of itself the second summer. I usually have my heifers to come in profit at two years old; they then pay for their keeping, and, if well fed and cared for, will continue growing and attain their full size. Heifers that are coming in in the spring of the year should be fed through the winter preceding, until within a month of coming in profit. Heifers that are coming in in the fall of the year will not usually require any extra feeding. I prefer to have one half my cows come in March, and the other half in September. This gives, as nearly as possible, a uniform supply of butter the entire year. During the winter the fresh cows are fed, as before stated, from 5 to 10 pounds of corn meal and wheat bran mixed in equal quantities, by measure, morning and evening, according to the age, size, and condition of the animals.

CARE AND MANAGEMENT OF MILK.

If we have been fortunate to select and raise good cows, and have given them good food, they will, undoubtedly, yield us a good article of milk. The proper care and management of milk for butter-making would, if thoroughly treated, afford ample material for an extended essay. In the time allotted me this evening, I can only notice, briefly, a few of the most important points.

A high authority, I think it is Professor Willard, says that the two leading principles to be observed in successful butter-making, are "cleanliness and temperature." To the first principle, that of entire cleanliness, all authorities that I have yet seen or heard, cordially agree; but whether the theory is faithfully put into practice by all its advocates, is a question I am unable to answer. The butter made, will best answer the question whether cleanliness has been observed in all the details of its manufacture.

Milk is a great absorbent of odors and impurities. It possesses this property to a greater extent than water. Hence, butter made from milk that has been kept in the family kitchen, exposed to all the odors of smoke and cooking; in the cellar, surrounded by decaying vegetables, and unpleasant smelling soap and vinegar barrels, or even in the dairy-room, if it is located where any bad odors enter. The butter made under such conditions, will tell its own story. In all the analysis of milk which I have yet seen, by eminent chemists, the percentage of butter has been given at 3¼ to 3½ per cent. Such milk that will not yield over 3¼ or 3½ pounds of butter from 100 pounds of milk had, in my opinion, better be sold by the quart, or manufactured into cheese. If we have the right kind of cows, and they have been properly fed, their milk will yield us 5, 6, or even 6½ pounds of butter from 100 pounds of milk. I think the samples of milk examined by chemists, and published in their works, could not have been obtained from good cows. My cows come up to the required standard in this particular. But while all are agreed upon the point of cleanliness, it is not the case in regard to what is the best temperature. In this particular point, dairymen differ in opinions all the way from the freezing point of 32° to the scalding point of 140° or 150°, if not to the boiling point of 210°. I do not propose to discuss any of these questions to-night, but will merely say, that I have seen it demonstrated by actual experiment, that good butter can be made when the milk and cream has been scalded, or heated to 150°, when it has been strained into shallow pans, and kept at a temperature of 60°, and also, when it has been put into deep cans, with close fitting lids, and kept at a temperature between 40° and the freezing point. The temperature does not appear to be so important in practice, if the other conditions of sound milk, perfect cleanliness, graduation of depth of setting to temperature, time of standing before skimming, management of the cream, churning, &c., have all been properly attended to. The only objection I ever had, or urged against, deep setting, or low temperature was, that the dairyman lost in the quantity of butter produced. In my trials of the Hardin box, during the past summer, I have found that milk set in close covered deep cans, sixteen inches deep, standing forty-eight hours at a temperature of 44°, yielded over six pounds of butter from one hundred pounds of milk, which is a little better than what I accomplished by shallow setting, while the quality was considered good enough to be entitled to an award at the Centennial exhibition, by the committee acting upon dairy products, last June or July. I have now no controversy with deep setting, or low temperatures, but leave these points to be decided by questions of convenience, or expediency, which each one should investigate and decide for himself. It is a little perplexing, however, to our inexperienced dairyman, to read such conflicting statements as frequently appear in our various agricultural papers. Of these conflicting statements, I will present two examples.

1st. In the Country Gentleman of November 23, 1876, is an article entitled "Action of Cold upon Milk," purporting to be an abstract from a paper read by Eugene Tisserand before the French Academy of Science. Numerous experiments have been made by exposing milk to different temperatures, varying from 32° Fah. to 100° Fah., and the following facts were elicited:

1st. The rise of the cream is the more rapid as the temperature to which the milk is exposed approaches 32°.

2d. The volume of the cream is greater when the milk has been efficiently cooled.

3d. The yield of butter is also greater when the milk has been exposed to a very low temperature.

4th. The skimmed milk, butter and cheese are of better quality when prepared under the above circumstances.

The second example is from an article on "heating milk," by Prof. Arnold, published in the Live Stock Journal, and copied in the Practical Farmer, from which I cut the extract, entitled "How heating milk assists in the rising of cream." "Milk, while hot, or overwarm, is thinner than when cold or cool, and offers less obstruction to the upward passage of the cream.

2d. A higher temperature expands the butter globules, which compose the cream, twice as much as it does the rest of the milk, thus causing the cream to rise more rapidly the higher the temperature."

In the proper care and management of milk and making of gilt-edged butter, I would name the following conditions:

1st. Cleanliness in milking and handling.

2d. Isolation from all bad odors while standing for cream rising.

3d. Skimming at the proper time, say forty-eight hours, giving time for all the cream to rise, and before becoming bitter by the decomposition of its casein.

4th. Keeping the cream at a low temperature, and churning at 55° in summer, and 60° in winter.

5th. Working thoroughly and salting the butter to the taste.

6th. I would not color butter artificially in winter, unless it be "chalk white," or as white as lard. Good cows, fed upon proper food, will make butter of a lemon color in winter, which is admired more by some than the golden orange color of summer.

A WORD ON DAIRY HOUSES.

In the care and management of milk for butter-making, the want of a suitable dairy-room, or buildings, will soon present itself. Much has been written and published upon this point, and as it is an essential one in making gilt-edged butter, it must receive a passing notice. It is as much a necessity to have a good place to keep the milk, as it is to have good milk to start with. Many plans for dairy buildings have been published, and patented, each succeeding one claiming that perfection has been reached. We should first decide in our minds what we want the dairy buildings for, and then construct them with a view to the accomplishment of our desires. Three years ago, I thought I wanted a dairy-room, where a uniform temperature of sixty degrees could be maintained at all times. I therefore placed the milk-room adjoining an ice-house, and provided for warming it in winter by consuming a few tons of coal; and for cooling it in summer by consuming a few tons of ice. The coal being the instrument of heating in cold, and the ice the agent of cooling in warm weather; a stove, or its equivalent, being a necessity in both cases. My building serves the purpose well for which it was built, and I will present a circular to any one desiring to examine its construction and operation who makes the application.

If, however, I desired to maintain the low temperament recommended by Professor Tisserand, I would construct a building upon Mr. Hardin's plan, by placing the milk-room under the ice, and have it raining down upon the covered cans of milk. And again, if I wished to heat my milk to one hundred and fifty or one hundred and sixty degrees, as recommended by Professor Arnold, I should then want my dairy buildings constructed upon entirely different plans. So great have been the discoveries of modern science, that men can now control the temperature, (in limited spaces,) and have it as they want it, anywhere between eighteen degrees above zero to the boiling point. We can freeze our milk into a solid block, and hold it there, indefinitely, in the Allegro Iceberg Antiseptic Refrigerators, or boil it in the vats of the cheese-makers.

DISCUSSION.

Mr. Skelton—Had had but limited experience as a farmer, but would like to ask whether Mr. Reeder had given as much attention to Shorthorns as to Alderneys?

He regarded it as true that certain strains of Shorthorns are not adapted to dairying, but yet there are other strains that are emphatically good milkers.

I have a cow 5 years old, that has given 12 quarts of milk a day for three months, while her calf was running by her side and sucking at pleasure.

Every dairyman should be very careful to adapt his breed to the nature of his pasture.

If the farm be rough and steep, and difficult for cattle to climb over, he should select a small breed, lithe and nimble, while on more level and smooth pastures, a larger breed is more desirable.

Professor Arnold inquired whether it is a rule with Jerseys that they possess more uniformly yellow skins than other breeds.

Mr. Reeder. I think not.

Mr. Arnold. If not, then is it true, as often stated, that the Jerseys, as a rule, produce more yellow butter than other breeds?

Mr. Reeder. I think it is true.

The committee on nominations were requested, by the present incumbents, not to present their names for reëlection, feeling that they were entitled to a respite, and believing in the principle of rotation. The committee, however, pressed them so closely, that they were induced to recall their peremptory declination, and accept their respective positions for the ensuing year.

REPORT ON DAIRY IMPLEMENTS.

We, your committee, would respectfully report that we have examined the Economizer Boiler, the Hubbel Gang Press, and the improved Curd Knife, exhibited by Whitman & Burrell, of Little Falls, New York, and deem them worthy of consideration by dairymen. The improved curd knife we would commend to especial notice.

A. E. HARPER,
H. C. KING,
H. MCGUIRE.

The following resolutions were passed:

Resolved, That the thanks of the Association be tendered to Honorable S. J. Logan, for his efforts in securing to us the legislative appropriation that ensures the publication of the last annual report, in connection with that of the State Agricultural Society.

Resolved, That we request our present representatives, Colonel O. O. Potter and Colonel Tyler, to secure, if possible, the publication of our report, for 1877, the same as last year, and that the recording secretary shall be paid $25 for compiling and transcribing the same.

Resolved, That we hereby express our thanks to J. B. Wilbur, for the free use of this hall, and to the citizens of Cambridge for their generous hospitality.

A vote of thanks was also tendered to Honorable Eastburn Reader, for his very carefully prepared and instructive address, and Professor Arnold, for the very important information imparted by him in his regular address, and also in response to the many questions put him by members of the convention.

The attendance throughout was unusually large, every seat in the hall was occupied at each session. A large number of ladies were present, and the addresses and discussions commanded the closest attention of the audience.

SPRING MEETING OF PENNSYLVANIA DAIRYMEN AT SAEGERTOWN, APRIL 4, 1877.

The association was called to order at 2, P. M., by President Fuller.

The minutes were read by the secretary.

At the opening of the afternoon session, the President, A. M. Fuller, made the following remarks upon

"The Future of the Dairy Market:"

I think this may well be regarded as the most important meeting of the association to be held during the year. We are met, on this occasion, for a prospective rather than a retrospective view of the dairy business, and for the general discussion of the plans best suited to promote its welfare, rather than to entertain labored addresses upon special subjects relating to it. I deem it a source of congratulation to the interest, that the dairy business is, at the present time, in so healthful condition; but I believe we should guard carefully against over confidence; hence I would invite you to a discussion of the future of the dairy market—a subject which, I fear, is too little thought of by factory men, and still less by their patrons. Forewarned is forearmed. I regret that I am not prepared to-day to present this subject to you with the care which I believe it demands; yet, I feel that it is timely and proper that it should be referred to at this time. The present condition of the butter and cheese market is a peculiar one—cheese is very firm in price, while butter is comparatively low. I say comparatively, for butter at 26c. per pound is not low, only as you contrast it with the price obtained for cheese. We here see price governed by the unalterable law of supply and demand. Suppose the supply of cheese had been as largely in excess of the demand as is that of butter; in this case it would be worth, at the present time, but 9 to 10c. per pound, instead of 15c., and what reason have we for supposing that perhaps the market may not be reversed another season? Last season was a peculiar one in the history of the interest. The production of cheese fell short fully 200,000 boxes, and had we the usual production, and an ordinary season, I think no one would question but that cheese must have ruled much lower in price. I desire, however, to take even broader ground than this, and would suggest whether there is not good reason for believing that the price of both butter and cheese will be materially lessened in the near future?

Dairy products have suffered little from the gradual depreciation in values since the panic of 1873. Other farm products—grain, wool, and stock—have reached more nearly the level of a specie basis, to which all things are now tending. It would necessitate a lengthy argument to fully explain the various causes which affect, and which must, eventually, result in a lessened price for dairy products. Suffice it to say, such causes do exist. I believe no one, who has devoted thought to this subject, can feel assured that this state of affairs may not occur. Let the price of dairy products be what it may; if low in price, it will be because other farm products are equally depressed. Hence, I feel confident that, relatively, the production of dairy goods will still rank as the most profitable branch of farming in those sections which are best adapted to it. I do not wish to say aught that may be considered as discouraging to the interest; but present this subject thus briefly, in the hope that it may influence you to exercise due caution in your transactions in the future, and prepare you for what is not at all certain, but, to say the least, not impossible.

It would, no doubt, prove advantageous to the interest if there was a more careful study, on the part of both factorymen and patrons, into the causes of the various changes and sudden fluctuations which the market presents from time to time, and thereby prevent the disappointment which must arise from unexpected, though not necessarily unforseen, circumstances. My object in presenting this subject now is, that in case factorymen are disposed to buy milk the coming season, to suggest whether it will not be safer to base calculations upon what may be, rather than upon what has been, and also to arouse the interest to exercise more thought upon this important subject, and thereby be enabled to arrive at correct conclusions, instead of attributing the drawbacks of the business entirely to local influences.

DISCUSSION.

H. C. Greene. Our President's remarks are both well timed and well chosen. I think it is wise to prepare our minds for low prices. The tendency of dairy products, like that of everything else, is downward, toward a specie basis. Greenbacks are now worth almost as much as gold. While these things operate on everything else, how can we expect cheese and butter to be exempt from the rule. Buttermakers have got bitten this time—leaving the factories just at the wrong time, and suffering the consequences in low price of butter all through the winter. Hundreds of tons of butter now in New York will be sold, in fact, is offered now, with few buyers, at less than the price of first class cheese. They will not get bitten in the same way two seasons in succession. The result may be a rush into the factories, and an excess of cheese. How this may be, no man can tell now, but it will be pleasant to receive more than you expect, rather than to get your expectations raised so high as to meet with disappointment. Those who contemplate buying milk will be wise to base their prices on the probabilities of a slight depression in prices of cheese rather than on an improbable advance.

I. R. Hall agreed with the remarks of Mr. Fuller. While gold is getting down to its true value, prices of other commodities must be expected to come down also to specie basis.

"Shall we Brand Our Cheese."

J. M. Bigger. I think the time has come when we should brand our cheese with not only "Pa.," but the name of the county and factory. The cheese factory system was pretty well established on both sides of us, when it was introduced here, and had we started right and left skimming alone, and branded our cheese, instead of creating a prejudice in the market against us, that has taken a long time to overcome, and prevented our cheese from being quoted at all, we might have had the satisfaction of seeing them quoted as "Fancy" in all the leading reports of the market. Buyers have sometimes objected to having the cheese branded, this shows that the brand would have an influence in disposing of them, and is an argument in favor of making the kind of cheese the market requires, and branding, thereby introducing them in the market under a name that they will be known by and sought after. In this way an individual factory, county, or State may become famous for its fancy cheese. It should be remembered that the quality of the cheese is what makes the reputation of its brand—a brand of good reputation creates a favorable impression, and invites inspection.

Several years ago Central New York had the reputation of producing the finest quality of cheese in America, and their brands were most sought after in Europe, and brought several shillings per hundred more than Canada cheese. The Canadians were not satisfied with this. A factoryman there resolved to test the quality of these cheese on an equal footing with the York State cheese. He accordingly selected two shipments, of exactly the same quality, one he sent direct from Canada to England, as Canadian cheese, the other he shipped to New York, and reshipped them to the same market in England. Now mark the result. The cheese shipped from New York brought New York fancy prices, while those shipped from

Canada sold for several shillings per hundred less. This shows the importance of not only making a fine article of cheese, but branding them. Central New York seems to have relied too much on the reputation of these brands, and lost sight of the importance of keeping up the quality. They fell into bad habits of skimming and employing unskilled help. The result is, with the exception of a few well-known brands, the quality of their cheese has deteriorated, while Canada has improved, and now Canada would rather ship her cheese under her own brand. Hence the importance of quality. The exhibition of cheese at the Centennial, where no prejudices existed for or against brands, resulted in Canada standing first, on a general average, in point of perfection, Pennsylvania second, and York State third. It will be seen by this that Pennsylvania can make fine cheese. Make more of them, and brand them.

I. R. Hall said: I have sent cheese to the various markets. Generally the buyers have requested me not to brand my cheese, and I have been scolded because I did not heed their requests. A Philadelphia dealer told me he had sold a lot of my cheese as New York State, but when opened and found branded with my name and location, the sale fell through, though no fault was found with the quality. I say, let us be independent, and make for ourselves a reputation by branding our goods truly. Let us do what we do above board, and, by branding the cheese, we will compel the dealers to work open handed also.

G. W. Carroll. Shall we brand our cheese? Yes, with our factory brands, but not with our locality.

The times are too hard, at present, to allow the prejudices against our locality to rob us.

Let us not be in too great a hurry to acquire a local reputation, since it is not so important as a good factory reputation.

Suppose an invoice of cheese branded Herkimer county, New York. The county brand would not be a sufficient guarantee as to quality. It is too broad a distinction. More than a hundred factories have the same brand, and such cheese would have to pass on their merits under the tryer. But, let the brand be simply "Old Fairfield Factory," and it would be considered a sufficient guaranty, and there would be no question as to quality. Hence we conclude, that however popular a locality may be, yet each factory in that locality has to depend upon the quality of its own production for a good name. And if we can maintain and elevate the standard of each individual factory, the local standard will take care of itself. Let us, then, run our factory brands up to a high standard, and hold them there for a few years, and our locality will gradually become known as a superior cheese producing region, with little cost to us. Never change your factory brand. Always brand your boxes in a similar manner, from year to year, and cheese men will soon be able to recognize your cheese in any part of the world.

This being the case, any one can see how important it is to maintain the factory standard, and how shall we best maintain it? First, by not skimming. In order to make any money by half skimming, somebody has to sell those cheese for what they are not, and the buyer, or retailer, and consumer finds, when it is too late, that they have been badly beaten, and thus American cheese are brought into disgrace, and bad repute, all for a "leetle" money. Judge ye. Is not skimming, like spoiling a jack-knife, worth a dollar, skinning a flint for the hide and tallow. Like stealing from the poor man's bread and cheese, (butter to sell.) Like selling a horse as sound, that you know is not sound. Do half skim factories brand their cheese as such? If not, does it not show a willingness on their part, that dealers should be deceived and pay full price for an article which the factory has knowingly reduced in value. Is this not of doubtful morality? Has the old adage, that "honesty is the best policy," lost its significance; that factories can afford to deal thus. Have not some factories died of skimming? Is it not sure to kill? If half skim factories will brand their cheese as half skims, and dealers will let the brand remain, all cause of complaint will cease, and the skimming will cease too, because then it would'nt pay.

Maintain the standard by putting in large watering troughs at every spring and brook on your farm. Otherwise, your cows for days at a time, will have but little water, and that little will be filthy stuff, covered with excrement full of typhoid fever, and cannot fail to produce tainted milk, nasty, barn-yard-flavored curd, and poor cheese, of little value.

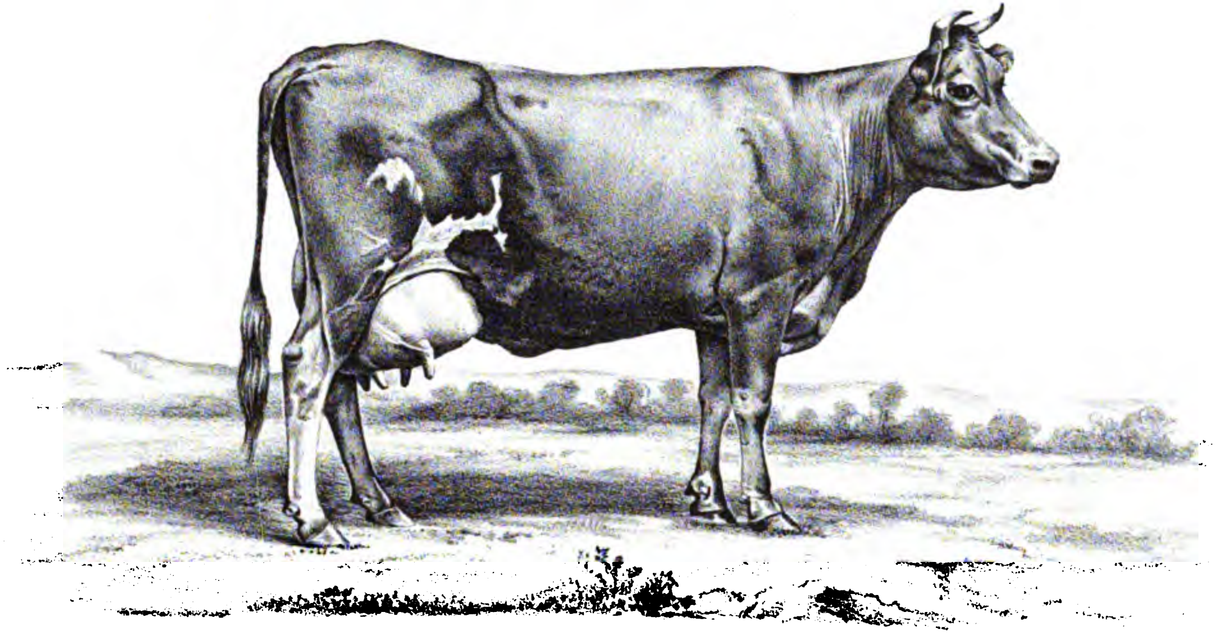
Place a barrel near the milking-yard, keep it full of water, furnish each milker with a basin to dip the water to wash and cleanse each cow's teats before commencing to milk, then the milker's hands will not look and smell as though they had been in a manure heap. Neither will there be such quantities of sediment in the bottom of the milk can when it arrives at the factory. Keep an eye on the milkers, for some of them are so intolerably nasty as to dip their hands in to the milk to wet up the cow's teats as often as they become dry in milking.

Do not send milk drawn from cows while they are in a heated condition, from whatever cause, to the factory. Keep it at home, it is of more value for calves and pigs than for anything else. But if you are tempted by your saving proclivities to send such milk, just remember that for every cent's worth of such milk sent, your dividends will be reduced ten cents.

Kill your dogs, and prevent your hired man from robbing you more than his wages by dogging up the cows.

Keep cold water and ice away from milk until it has been thoroughly

UNIV. OF MICH.



Imported Jersey Cow

"PANSEY" HR.2479.

Property of Charles L. Sharpless, *Chilton Hills, Pa.*

aired, unless you want to spoil it. The practice of setting a milk can in ice or water when you commence to milk, and then turning the milk into it as fast as milked, may be an expeditious way of cooling, but it is as foolish and unscientific as it is expeditious. A moment's reflection ought to teach us, that by this practice, all the deleterious gasses and noxious odors will be condensed at once, and retained in the milk, which will work its early ruin. After the milk is thoroughly aired, then use a thermometer, and cool it down to about 70 degrees. Don't think you can tell the temperature without the thermometer, because you can't do it. Spread your milk after cooling it in all the cans you have, but if water and ice for cooling is not to be had, then spread your milk out in pans, and let them stand in the open air three or four hours, then turn into your cans. This will usually be sufficient, but nothing short of this.

Build open airy sheds to protect your milk cans from sunshine and rain, then you will not be tempted to put on your can cover some stormy night, and spoil your milk. Wash and scald your milk cans immediately after arriving at home, then set them in the sunshine that the bad odors may fly away. Seven washings will not divest them of bad odors, they must have time to fly away. The dilatory practice of allowing cans to stand unwashed all day long on the platform, and then at milking time, giving them a hasty washing, and turning the milk immediately into them, before the germs of fermentation have time to fly away, is one prolific source of poor milk. Don't think you can scald your cans with cold water, because you can't do it. Neither think you are secure from loss, if you can only get your milk to pass at the factory.

A. J. Whipple. Would it not be well to grade cheese, and brand it according to quality, as is the case with flour, best quality, XXX; second, XX; third, X, &c., so that every grade shall go on its own true merits?

L. C. Magaw. I would like to see everything branded that goes upon the market. Every man ought to be branded on his face, so that we may know what kind of a man he is, and so with every article of commerce.

H. C. Greene indorsed the prevailing idea, that cheese should be branded according to its merits.

S. A. Farrington. The result of the exhibition at Philadelphia last fall showed that Pennsylvania can make just as good cheese as New York, or any other section, and does make some cheese of unexceptionable character. Still, it is true that the average quality of our factory products is not as good nor as uniform as that of Central New York.

One reason why your cheese exhibited at the Centennial stood so high was that you had two of the best judges in this section to select it, and they selected the very best you had to send for exhibition. This makes a great difference with the matter. No section makes all fancy cheese and no common or poor. Put your best foot foremost; brand your best for the present and let the poorer grades go without a brand.

M. H. Terry. I believe the time has come when you may safely brand your goods with its local brand.

The following resolution, offered by H. C. Greene, was then adopted:

Resolved, That it is the sense of this association that Pennsylvania cheese is of an average grade that entitles it to stand on its own reputation, and that it is good policy to brand our fine cheese as Pennsylvania cheese.

Best Method of Improving Curing-Rooms.

Hiram Canfield. The speaker gave a description of the common curing room, having nothing between the cheese and the sun but a single inch board, and the shingles on the roof, which attracts the heat so that the cheese are almost melted down in hot weather.

Plastering large curing rooms involves a considerable expense, and is not entirely satisfactory. There is a style of paper manufactured for the purpose of lining rooms and buildings that is said to be more effectual than plastered walls, and at a much less expense. B. E. Hall & Co., 56 Park Place, New York, are the manufacturers of this paper, and of them it can be obtained.

G. W. Carroll. I sent, last year, to Weeks & Brown, Syracuse, for 100 yards of this paper as an experiment, fearing it might not remain firm. I found it to keep its place much butter than I expected.

While it is tender, and will tear easily if carelessly treated—so may a plastered wall be destroyed—and, therefore, we are careful not to injure it.

J. H. Dunn advised placing the paper against the studding, and lining with half inch boards, which makes an excellent, neat, and strong wall.

L. C. Magaw advised buying in large quantities, by several parties clubbing together.

S. A. Farrington stated that he had learned of a creamery at the West, which had provided a room with the building paper. Upper rooms are not as good for curing rooms as lower rooms. They are too often used, because the labor of taking care of cheese, in a dry room, is much less than in a damp one, and the lower room is always the dampest. We may retain too much water for the good of the cheese, and we may, also, allow to much water to evaporate, and the quality suffers by it; the cheese appears often to be skimmed when there has been no skimming done.

A question arose as to where the responsibility for poor cheese should rest.

If our cheese sells, some for the top price, and a small portion at a ruinous price, who must stand the losses?

H. Canfield. The patrons of this section, many of them, think this association is run in the exclusive interest of the of the factorymen and dealers. How shall we convince them to the contrary? You must convince them, or you cannot get them in here, and if you do not get them under your influence, I would like to know how you are to raise the standard of cheese.

S. A. Farrington argued for a closer examination of milk, and, at the same time, insisted that no factoryman had a moral right to receive milk of a man, whose milk had been rejected because it was unfit to use.

The chemist even cannot at once determine the true character of milk. He must have a few hours time, before the results of his investigations can be determined. A single cow's milk often spoils that of an entire dairy or factory.

EVENING SESSION—7.30, P. M.

The Relations of Patrons to Manufacturers.

J. H. Dunn. I regard the interest of dairying, in this section, paramount to all other agricultural interests. Its success depends upon the wisdom of those who are engaged in it.

The relations of patrons to manufacturers is of the highest importance. The present state of this relation is not satisfactory, and does not tend to progress. The present state of competition between factories is deplorable and ruinous. If they could secure success, they must, by some means, arrive at a better understanding among themselves, and thus encourage patrons to regard their responsibilities.

Something must be done to prevent patrons disregarding their obligations to their home factories. There must be no more spying into each other's territory to secure their business. Factorymen must learn to do their duty to their patrons, and patrons remember their duty towards the factorymen, or the business must go down.

It is deplorable that the farmers do not, and will not, attend these meetings, where knowledge is so freely obtained.

Factorymen must take more pains to educate their patrons in those things wherein they are most ignorant, for they are often more ignorant than dishonest. They need to know more about their business, and you must teach them. Then you will see better times.

I speak more to factorymen than to patrons, because the few patrons present at these meetings are of that class that take the best care of their milk, and manage the best generally. Therefore, I make this last appeal to factorymen. Do come to some understanding among yourselves, and all stop running into each other's fields, to try to steal, or allure away, the patronage that belongs naturally to them, and not to you.

William Nash. I have only to say that the remarks of Mr. Dunn meet my mind. I indorse them heartily, and admit that he has expressed my mind better than I could do myself.

I. R. Hall. I nave an interest in this matter, and am anxious to see fair competition and good understanding between all concerned in this interest. I desire to see factorymen and patrons working shoulder to shoulder, and to see the time when the cheese maker may condemn bad milk, and receive the thanks, instead of the curses, of the owners of the milk, who may be often ignorant of its real condition.

A patron believed that if the practice of returning the milk promptly was more common there would be less trouble, and much less poor cheese than now.

Mr. Amidon had had very good success educating his patrons, by talking to them plainly, but kindly, and never censuring them openly for their faults.

Mr. Culp. Some patrons seem to think that it makes but little difference what the quality of the milk may be, and still they exact the best quality of cheese. I have been looking over the matter, and see that in New York, where they make the finest cheese, the patrons are better informed than we are. They have no better country for the business than we have, but, by taking more pains, they make more money. When our people get to taking more pains, they will get better satisfaction, and the business will be more prosperous.

T. H. Dunn. I would just like to know how many of these factorymen are willing to form a contract, agreeing to bind themselves to reject all bad milk, and never to receive a man as a patron after his milk has been rejected at another factory. Just as long as you insist on going into each other's hen roosts and stealing out their best chickens, there will be trouble with your business.

A. J. Whipple. I heartily indorse the idea of a previous speaker, that the best way to reform the abuses of the factory system is the rule of kindness and of fairness.

The suggestion to enforce an iron rule, may not work so well. Our factories should run more on the plan of our grist-mills, and if any man is not pleased with my way of grinding, I do not expect the miller at Venango to refuse to grind his grist.

Messrs. T. H. Dunn, William Nash, and I. R. Hall were appointed a committee to draft resolutions tending towards removing some of the difficulties that now stand in the way.

Mr. Ferrington hoped that something might be done to put a stop to this suicidal warfare. As long as this style of competition exists that now exists in Crawford county, there will be no further progress.

I hope the report of this committee will embody some provision whereby a better state of things may be.

Walter Dunn would like something to be done to prevent the practice of factorymen going in early winter into every important neighborhood, and engaging every person that can be hired to haul the milk to his factory, so that there was no drawers for competitors to employ.

H. C. Greene. There is certainly great need of a reformation among our factory operators. The practices complained of have become the bane of the business and done more to injure it than all else. If the time has not yet come when factorymen can coöperate, as other interests coöperate, and by combined action effect a better state of things, it is probably best that they should take a few more of the bitter pills they have been taking for a few seasons past. Perhaps another season's experience, in the same line, is necessary to bring them, where they must come, sooner or later, to a basis of honorable, fair, and square dealing with each other. Until they can unite, to put down dishonesty and trickery among themselves, there will be no more progress. I think it is too late to do much for this season, but I do hope that another early winter will not be allowed to pass without wise action.

Mr. Hickernell. I think you need to have more patient cheesemakers. He had had some sad experience with a vicious, red-headed cheese-maker, which he related for the amusement of the audience.

We don't want our cheese-makers employed to fight the patrons every morning.

Mr. Farrington. We do certainly need much discretion in this matter. Francis Murphy has placed at the top of his temperance pledges the language of the lamented Lincoln: "With malice toward none and charity for all." We need to use much charity, but to exercise our skill and judgment with the greatest firmness, and yet without malice.

REPORT OF COMMITTEE ON CO-OPERATION.

We, your committee, report the following suggestions for your consideration and adoption, viz :

First. That the existing rivalry among factorymen is injurious to the dairy interests.

Second. That the practice of manufacturers of establishing milk routes, buying milk, or using any influence outside of the manufacturing of a good article, is the cause of ill feeling among factorymen, and should be abolished.

Third. That such rivalry makes it impossible to correct the evil of receiving bad milk.

Fourth. To the patrons we would say, that the use of rusty cans, wooden pails, and the improper care of their milk, destroys the quality of the product, so that it has to be sold at low and unprofitable prices.

Therefore, we recommend a hearty coöperation of manufacturers and patrons, to remove these serious evils that stand in the way of progress, and we believe that such coöperation alone will insure the progress and improvement in our products we must attain to, before we can reap the greatest profits of our business.

T. H. Dunn,
I. R. Hall,
Wm. Nash,

BREEDING AND CARE OF DAIRY STOCK.

Address of Mr. Wm. Skelton, of Mead.

Without any desire or intention to disparage, by what I may say, the claims of any other breed of cattle to preëminence in the dairy, I wish to say that those who fancy the short horns without merit in this particular are victims of a great delusion. Originally, the short horns were maintained, in part, for their dairy qualities, and it was as possessing these qualities in a high degree that they first came into great prominence. The herd of the famous Thomas Bates, descendants of which sell to-day for such fabulous prices, that it would almost seem as if they belonged to some other order of animals, were brought together and kept for years as dairy cattle, and among the earliest things we know of them is the matchless quality of milk and butter that was produced by those short horn cows. There are other breeds of cows that I believe to be good milk and butter and cheese producers; take the Holsteins, the Ayrshires, and some few of the Devons.

And here let me give you my reason for leaving out the Alderny. I am talking to farmers, and what you want is a good farmer's cow, and some one has to convince me yet that the Alderney cow is the cow for the farmer. You are all well aware that the end of all cattle is beef, and the other breeds of cows I have just mentioned will each compare favorably in this respect, but what shall I say in regard to the Alderny on this point? Ladies and gentlemen, there are no beef qualities belonging to them, and that is why I object to them as a cow for the farmer.

I am not aware that any of the breeds of cows that I have just mentioned have had the misfortune that the short horn cow has had. She was bred for fancy, for fine form, and for show, and has been encouraged to put on flesh by every art and appliance that could be brought to bear upon her. The result of such treatment, continued through generations, has been to dwarf the animal in her milking tendencies. But the condition of the short horn cow that makes her a poor milker is purely an artificial one, opposed to all her natural inclinations and tendencies, and so she responds promptly to the efforts of the breeder who makes the effort to bring her back to her old natural habits. And the time is near at hand when breeders of short horns will be compelled to pay more attention to milking qualities, when it will be said of an animal that her dam made so many pounds of butter in a given time, the dam of the sire gave so many thousand pounds of milk within the season, and the grand sire was the sire of the first prize milch cow at such and such fairs, the first among a hundred entries. Farmers have no use for cows that simply raise a calf; they require a cow that will raise a big stout calf, and more than pay her keep besides at the pail. This is the kind of cow the breeder of short horns must provide for the coming farmer.

I have gathered a few of the statistics of the milking qualities of the short horn cow. The first I have copied from Youatt and Martin, which is an English standard work, and the names I will mention are names of men who are above suspicion, and stand high in the history of short horns. In 1795, over 80 years ago, Mr. J. Baily and Mr. G. Cally made a report to the board of agriculture, of the county of Northumberland, on the milking qualities of different breeds of cows, in which they mention the short horn, long horn, Devonshire, and the Alderny. Their report reads as follows:

The most essential difference consists in the quantity of milk the short horn cow gives beyond most other breeds, there being instances of of cows giving 36 quarts of milk per day, and 48 firkins of butter being made from a dairy of 12 cows, but the more general quantity is 3 firkins of butter per cow, in the season, and 24 quarts of milk per day.

In 1810, the same Mr. Bailey gives particulars of an experiment made by a Mr. Walton, of Middletown. He took from his dairy six cows promiscuously, and obtained the following quantity of butter from a quart of milk from each cow: No. 1, 3 oz. 6 pwt.; No. 2, 1 oz. 6 pwt.; No. 3, 1 oz. 12 pwt.; No. 4, 1 oz. 10 pwt.; No. 5, 1 oz. 14 pwt.; No. 6, 1 oz. 6 pwt.: Total, 10 oz. 8 pwt., which divide by six leaves nearly 1 oz. 14¾ pwt., or I will call it ¼ pwt. short of 1¾ of an ounce for each cow. Now we will suppose we have one of those short horn cows, giving 24 quarts of milk per day: then the above experiment would prove she was making about 2 pounds 10 ounces of butter per day. This experiment brought to light another good quality in the short horn, which, if not altogether unsuspected, was not sufficiently acted upon, that she improved, as a dairy cow, as she got older. The cow, a quart of whose milk produced more than 3 ounces of butter, was six years old, the other five were only two years old. The experiment proved that her milk was richer at six years old than at two, and I have no doubt but what those experiments were carried out when those cows were on pasture alone, for if grain or roots had been given to them, I it would have been mentioned by Mr. Bailey.

About the same time the following observations were made by Mr. Calvert, of Brampton, on the quantity of butter made from one of his short horn cows. The milk was kept and churned separately from that of other cows, and the following is the number of pounds of butter obtained in each week: 7, 10, 10, 12, 17, 13, 13, 13, 15, 16, 15, 12, 13, 13, 13, 14, 14, 13, 12, 12, 13, 11, 12, 10, 10, 8, 10, 9, 10, 7, 7, 7; which will foot up 371 pounds, but Mr. Calvert says there were churned 373 pounds of butter, in the space of 32 weeks. The cow gave 28 quarts of milk per day, about midsummer, and would average nearly 20 quarts per day for 20 weeks; she gave more milk pastured in the summer, than when soiled in the house, in consequence of the very hot weather; and she was lame six weeks from foul in the feet, which lessened the quantity of milk. Now, I like this statement, or experiment, rather better than the others, as it gives all particulars as to the keep of the cow at the time the experiment was carried out.

The following I have copied from the National Live Stock Journal, of Chicago: "E. S. Frazee, of Orange, Indiana, says: I have a short horn cow, 'Jassamine,' Vol. II, page 724, A. S. H. H. book, that is a fair dairy cow, after her calf was weaned, and she was pretty well along in calf again, we saved her milk and churned separately, and made from her, in one week, 8 pounds 10 ounces of nice yellow butter; her yield of milk was between five and six gallons daily. She had the run of a blue grass, and timothy pasture, and, in her flush of milk, would have made from ten to twelve pounds of butter per week. Another cow, 'Maggie,' Vol. XIII, page 757, has been giving milk for 16½ months, and is due to produce a calf in 2½ months, from the present time of writing. I have been trying for some time past to turn her dry, by milking her but once a day. She is now giving 2½ gallons of rich yellow milk at a milking, and certainly would not go dry at all if milked regularly.

I do not wish to be understood to say that the short horn cow is the best cow for everyone; if some rich man or millionaire wants a cow for a plaything, there may be other breeds that would fit better for that purpose. But the toiling millions of farmers of this country cannot nor dare not overlook the useful, practical, and essential qualities of the short-horn cow, when chosen from those families that are known to be good dairy cows: First, rich milk and a large quantity; second, good butter and cheese producers; third, cannot be excelled for beef qualities; and lastly, if beauty is allowed to be brought in the balance of favor, the short horn cow stands second to no other breed of cattle.

Perhaps some of my brother farmers are about to say, we cannot afford to pay such large prices for milking stock; and here let me say you are not obliged to do so. I think the short horn sire stands ahead of all others for improving and grading up your common or native stock, not only improving the milking qualities of your herd, but the beef qualities also. So that, in a few years, with good feeding and careful breeding, you could have a herd of cows around you that no farmer would be ashamed of. The purchasing of such an animal as I have just mentioned would be lightly felt, if done by two, three, or more farmers coöperating together. The price of such an animal would be from two to four hundred dollars, according to age and style. Remember, that sires from good milking stock are not over plenty, and, on the other hand, you are well aware I am speaking now of those animals. My experience with grade short horn cows has been very satisfactory, and for all general purposes, makes a first-class farmer's cow. By close observation, I find the cream from a blooded short horn cow is rather heavy to the amount of milk given, also, richer flavored than the grade, so you will fully understand by this that the higher you grade up your stock, the nearer you will get to a first-class article of butter and cheese. Now, a word to those who desire or are about to improve their dairy stock: When purchasing an animal for that purpose, be very particular as regards the top crosses on the sire's side. Most breeders take a pride in tracing their herd back to some noted cow, such as old Daisy, or old Cherry, young Cherry, or a Constance, or, it may be, the world-renowned Rose of Sharon, and they will tell you what noted cows these were for the dairy; this is perfectly right and proper for every breeder to do so. They will, also, show you an animal, and tell you his pedigree traces back to one of those cows and some noted sire, such as Hubback, Punch, Waterloo, or old imported Duke of Airdrie. But what about the top crosses? By careful examination, you may find sires that have been bred to that have not been chosen from a good milking family. By purchasing such an animal, your desire to improve the milking qualities of your herd will be a total failure.

Perhaps some of my hearers would ask, how am I to know between those different families? I will answer, if I am so allowed to express myself, by book-farming; and here is a place we cannot get along without books, although some of my brother farmers may be strongly opposed to book-farming. When we get a good breed of dairy cows, what comes next? Good feed, kind treatment. How often is it the case, a good cow comes in fresh and gives a good supply of milk; the owner is pleased with this, but he neglects to help nature to carry on this work; finally nature sinks under this task, and the cow becomes almost a dry cow, when otherwise, if she had been properly cared for, she would have been in her flush of milk.

And now, my friends, ought we not to be thankful to the Great Giver of all things, in providing for our wants and comforts in the dumb animal, the cow? It has often impressed upon me, that there will be more required of us, as regards kindness to the brute beast, than many of us are aware, at the great summing up of all things.

Mr. Farrington. Are the Jerseys, Alderneys, and Guernseys one and the same breed, or different breeds?

Mr. Skelton. I regard the Jerseys as a distinct breed. They are very much larger than the Alderneys. In England they are large and heavy, often weighing 1,200 to 1,500 pounds each. The islands where they were produced are separate islands, and I consider the breeds just as distinct as the islands.

T. T. Root. I have never raised a calf in my life, but I think I can see that farmers need to improve, and can improve upon the common stock. We cannot afford to keep poor stock. We can't afford to keep even middling cows. We want only the best cows. All the rest are pulling us down. Only the best cows yield us a profit. I have always rather favored the native breeds, and think we had better spend our energies in improving native cows, than in introducing foreign breeds.

We need to take better care of our calves, and all the way up to cows. This is the time, above all others, when we should give our cows the very best of care and plenty of the best feed. I have a friend in the West who has met with grand success with the Ayrshires, and I believe them excellent milkers.

Mr. Farrington. This seems to be a very important subject, and we need to have it more thoroughly investigated. Our friend Root seems to injure his own argument. He first argues that farmers may better devote themselves to improving the common stock, but at the close, he tells us of a dairy of Ayrshires, and speaks of them as so much better than natives, which I believe they are. I do not understand Mr. Skelton to advocate that every farmer should invest in blooded stock, casting off his natives at once. This is not the way to work.

I. W. Allee spoke earnestly in favor of improving the grade of dairy stock, by the introduction of short horn blood. Other breeds are, no doubt, very valuable, but he favored the short horns, because he had known many of them to be excellent milkers, and they are certainly profitable when they have to be turned to beef.

The president here announced that the time had arrived for closing the session, and the meeting adjourned, with the best of feeling.

THE WAY OUT.

An Address by H. Cooley Greene, of Meadville, Pa.

All along the ages, from the days of Adam's transgression to the present, the law of development by labor has been rigidly enforced, and it is now pretty generally conceded, though the fact is not as generally appreciated as it should be, that there is no true and normal development of body, mind, or soul, but by the rugged road of patient and continuous industry.

This is "the way out" of the first great difficulty into which man stumbled by his own short-sightedness. We cannot choose any occupation that shall free us from the operation of this law. Wherever and however we may be employed, however simple our work may be, it cannot be so simple as to need no thought and no skill to render it successfull.

The axe is one of the simplest of implements, and the use of it one of the simplest of occupations, but neither the force nor the frequency of the strokes are available, independently of the proper form and condition of the implement, and the degree of skill, both of mind and muscle, by which the strokes are successively made to take the proper direction and strike at the proper point. And even when these conditions are fulfilled, they will be profitable or otherwise, according to the nature of the timber.

There seems little similarity between the employment of the wood-chopper and that of the dairyman, and yet the things that are essential to success in the one, are as truly essential to success in the other, viz: Adaptation of the raw material, of implements, of muscular strength and discipline, of skill, and adaptation of will-power, by which these forces are all concentrated upon a single point at every stroke, and such efforts repeated till the work is accomplished.

If the simple act of chopping a cord of wood involves the exercise of intellectual, as well as physical powers, how much more must the successful dairyman call to his aid his reasoning faculties. His business, with its endless complication of detail, calls for, and should receive, the best energies of his mind. From the beginning to the end it is a matter for thought and activity.

Breeding, feeding, and management of cows; milking, and the proper management of milk; manufacture, and proper management of cheese or butter; the sale of the manufactured goods; each and every step requires that the mind of the dairyman be always active.

Every item of experience or observation that can be made available, must be weighed and given due influence in the calculations and plans of the dairy farmer.

It is a pleasant reflection for the dairyman, that his occupation is so well calculated to develop in him those qualities that go far toward making up a perfect manhood.

There is in it enough of hope and enough of fear; enough of inspiration to activity and enough of groveling stupidity; enough of realization and enough of disappointment; enough of success and enough of failure; enough of independence and enough of dependence; enough of society and enough of seclusion; enough of confidence and enough of distrust; enough of labor and enough of rest; enough of knowledge and enough of ignorance; enough of light and enough of shadow, to draw out the latent forces of his nature and stimulate them to healthy growth.

I am aware that when I stand, as now, before a body of dairymen, in convention, I have before me the cream of the fraternity. I am speaking to minds that are trained to investigation, competent to sift the true from the false; privileged, and even urged, to set the heel of their disapproval relentlessly upon the neck of any theory that is not backed up by sound logic and practical utility. I shall aim, therefore, to be somewhat guarded in my remarks, and to keep on tenable ground, while in justice to my subject, I must speak plainly. It shall be my purpose, not so much to convince, as to convict and convert those, who, I shall assume, are already convinced of the truth.

While the subject implies that we have fallen into a pit, got lost in the wood, stuck in the mire, or got into something that we would gladly get out of, *and that we may get out of*, we are admonished to consider our case deliberately and with due regard for each other's opinions.

We are all in the same boat, and must lay our heads together, take our observations, determine our latitude and longitude, and then, with one consent, bend to the oars that shall put us ashore, where we are destined to browse over the great pasture fields of God. Sometimes the feed will get rather short, and perhaps dry and insipid; we may find it necessary to take the bitter in order to secure the sweet; but let us imitate the example of the model dairy cow, and industriously search out every hidden nook and glen, among the rocks and brambles, gleaning from every place and circumstance some sustenance to increase the flow of the milk of human kindness, and ensure the success of our calling, and the prosperity of our country.

Real progress is the reward of the teachable spirit that constantly reaches out for new facts, and never quenches the thirst for knowledge by flattering one with the belief that he has already reached the acme of human attainment. Especially is this true of the dairyman or the cheese-maker.

He who scorns the observations, experience, and opinions of the more intelligent of his own craft; who pauses, and sets himself down on the pinnacle of conceit, has finished his course as a successful cheese-maker, for the cheese-maker is nothing if not progressive—certain to fall behind his fellows, and soon finds himself plodding on alone, and clinging, with the grip of desperation, to ideas and theories that have been rejected by that class of hard workers and free thinkers who have put the dairy business of to-day so far in advance of what it was twenty years ago. The woodman who should attempt to chop with his eyes shut, would be a wise and successful workman, compared with the dairyman who spurns with contempt the aids that center in our dairy associations and boards of trade, and are so faithfully distributed over the land by the agricultural press.

When we consider the complex nature of dairying, it is not difficult to perceive that the progress recently made is mainly attributed to the methodizing and simplifying tendencies of the factory system, by which the responsibility, and largely the anxiety, of the farmer, ceases with the delivery of his milk at the factory, and that of the manufacturers ends with the curing of the cheese, when it falls into the hands of the salesman. By this division of the business into its several departments, a degree of concentration of thought is brought to bear that would not be attainable under the old system which, it is truly said, was no system.

Whatever the next important forward step may be in the way out, it cannot be by a return to the system of home manufacture. It must be in the line of march already taken, the improvement of some of the objectionable features of the present system, by the adoption of advanced ideas, and the closer, more perfect, and, therefore, more efficient organization of the various classes and interests whose real interest is one. Such an intelligent union as shall secure to each class its peculiar rights, while stimulating all to active coöperation, and inspiring a greater degree of mutual confidence and good will.

The perfect working of the factory system will not be accomplished until all classes—patrons, proprietors, cheese-makers, salesmen, and buyers, shall cease to indulge in petty jealousies, cease to poke each other with sharp sticks, and come to a mutual appreciation of the fact that in serving the highest good of the entire interest, the highest prominent interest of each will be secured; till there shall be known, within the fraternity, neither Jew nor Gentile, Roman nor Greek, bond nor free, "bloated bondholder," "voracious middleman," nor "honest Granger," but when each shall be recognized by all as of a common brotherhood, working for one common purpose. On the way out there must be no conflict of interests. The head may not say to the hand that feeds it: "I have no need of thee." Nor the hand to the head that directs its movements: "I have no need of thee." We must promote such a state of good will as shall lubricate the creaking machinery of the system and put an end to the friction that exhausts so large a proportion of its working force.

It is safe to assert that the larger part of the losses of dairymen, are directly attributable to tainted, or otherwise damaged milk. The remedy for this evil must be sought by coöperative action.

Dairymen must investigate this matter more carefully and conscientiously, and be more conscientious about delivering tainted milk at the factories.

A very important step toward inducing such carefulness, would be for factories to unite in the adoption of stringent and uniform rules, for the care and delivery of milk—such regulations that if a patron take offense, when his milk is criticised, or returned to him unfit for use, he cannot take it to another factory, and be accepted as a patron, till he first make the proper reparation where the injury was done. This a simple justice, whether as between patrons themselves, or as between factories, and it is a policy that should receive the hearty approval of both factorymen and patrons.

Something of this kind must be done.

Whether the taint be caused by neglect to bury the carcasses of dead animals; by cows feeding on rank and unwholesome herbage, or drinking impure water, by filthy pails, strainers, or milkers; by lack of ventilation or æration; by diseased cows, or cows suffering from fever and excitement, from extreme heat of the sun, or by being driven by dogs or thoughtless boys, or by undue excitement from any cause,—*for all these are known to be fruitful causes of taint*,—the dairyman is the principal loser. This point he can see plainly, and without argument. But here is a point he does not see so plainly: the seeds of the taint are sown, and often the taint is well developed, while the milk is on his own hands, and long before the cheese-maker, upon whose devoted head he would like to heap the blame, has seen it.

When we talk to the patron on this point, and endeavor to show him the true measure of responsibility as between him and his cheesemaker, we find him heedless alike of the lessons of science and experience. The plain, unvarnished facts are nothing to him. He rolls his eyes in derision, and curls his lip with scorn, and replies: "That don't wash; its all a subterfuge, gotten up by you cheese-makers, and paraded before the world at your conventions, to shift the responsibility upon our shoulders." And when he takes that position, argument may as well cease. That settles the matter. Such is the ignorance and willful blindness of these dead weights that fasten themselves upon the factory system, and have to be dragged along by their neighbors of greater intelligence and honesty of purpose. Such is the reward of the faithful cheesemaker, whose zeal in his profession leads him to do his full duty, and more than his duty, on behalf of ungrateful patrons.

The dairyman's best way out of this evil, is by a careful study of the nature of the cow, and the machinery by which she converts food into blood, and blood into milk; into the nature and constituent elements of milk, and the cause of its early decay. When he comes to study these things carefully, he will no longer doubt the fact too frequently demonstrated in the experience of every cheese-maker, namely: that spoiled milk cannot make fine cheese.

We shall never find our way out by flooding the country with skimmed cheese or poor cheese of any description.

The successful market dealer aims to keep his stall supplied with thy very best articles in his line to be obtained, knowing that only in this way can he secure the custom of people of means and refined tastes. So the way to improve the market for dairy products, is to keep a full supply of fine dairy products always on the market.

The way to get through a dull cheese market satisfactorily, is to have only the finest cheese that are always inquired after. There is never a time when really gilt-edged cheese or butter is not sought after.

The sooner American dairymen learn to coax the market, instead of fighting it, the sooner will they find their way out.

The soft, porous flat cheese, made flat because it cannot be restrained if built up in the cheddar form, that in cool weather is fair to look upon, but which rises, like biscuit, with a rising temperature, that swells on the shelves, swells in transit, swells on the dock, or in store, that forever swells, till it bursts its sides by swelling, liberating the pent up gas, and pouring over the sides of the box a stream of liquid, molten cheese. The manufacture of this style of cheese will never lead out of trouble, but always into it, and yet a great deal of cheese of this description is sent to the seaboard markets every summer.

The successful cheese-maker now must be skillful in the use of acid. He must be able to make a cheese pretty in form and color, to please the eye, close in texture, tender, and yet firm in body, and of pleasant milky flavor, to please the palate, and accompanied with no rank odors to offend the nasal sense. Such a cheese will mature in forty to sixty days, and endure transporting a thousand miles under a July sun, with scarcely any perceptible change in form, flavor, or character.

The way out, is by encouraging home consumption, even at the risk of sacrificing, to some extent if need be, our credit abroad. Let us save enough of the best, at least, to amply supply our home markets, instead of selling to the exporters our best, and keeping for our own people, only such as the exporters refuse to buy.

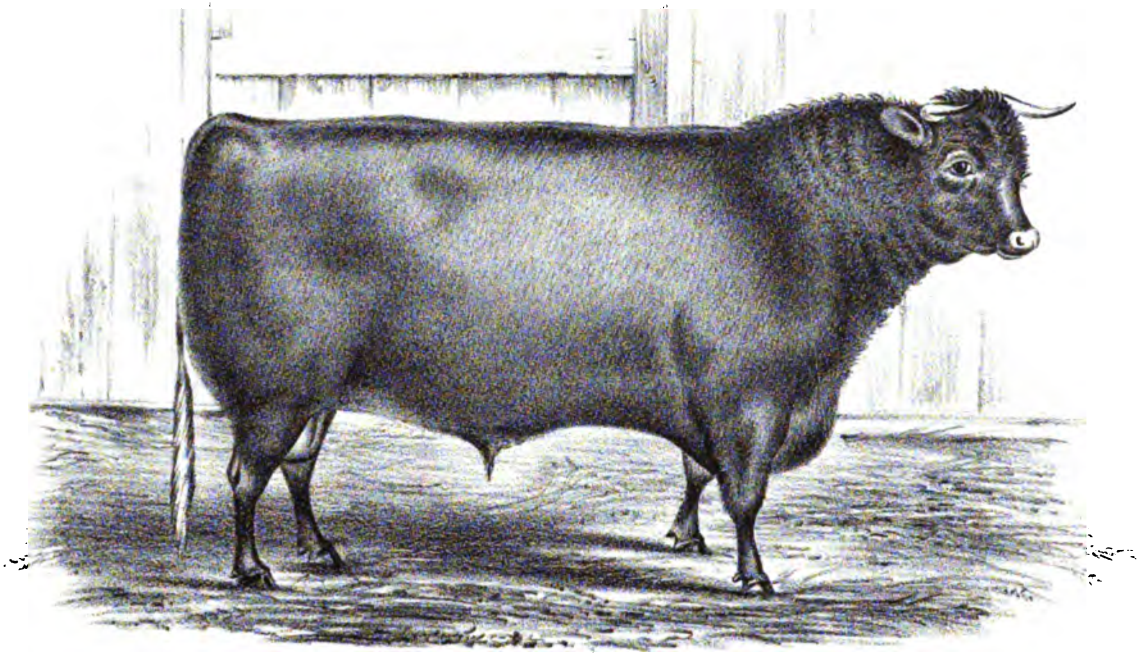
In the matter of food, as in nearly every other matter, we are creatures of habit. We form our likes and dislikes for given articles, and then we say of them that they are palatable or otherwise, as the case may be, when the fact of their being so lies with ourselves and not with the food. We often form a relish for dishes that at first were utterly repulsive to us. I know a colt that eats fine cut tobacco as greedily as a stable boy; and this is less surprising than that intelligent and well bred people should learn to eat the greasy, nasty, and absolutely filthy, substance called butter, that so often finds a place on our tables; and so it has passed into a proverb that there is no accounting for tastes.

Of the six hundred million pounds of butter made in the country, five hundred and forty-millions, or nine tenths of the whole product, is consumed by Americans. This is about thirteen pounds *per capita.*

Of the two hundred million pounds of cheese produced, we consume only eighty million pounds, or four tenths of the product, which is about two pounds *per capita*, counting our population at forty millions.

Americans are, then, consuming over six times as much butter as cheese. Why this discrepancy between the consumption of these two articles? It will not be said that it is a matter of economy. It is not that reason gives to butter a preference over cheese on the ground of cleanliness or purity, for it is hardly possible to get so much real filthiness into cheese that is made up from milk principally but a few hours old, as finds its way into butter, from the setting of milk in foul and filthy places, where it is exposed to the odors of decaying substances, or of the kitchen, as well as to the depredations of flies, bugs, snails, and other vermin.

Probably the chief reason why so little cheese is eaten by Americans is



LOVELY'S HURON 4TH

4 Years.

Property of Walter Cole, *Batavia, N.Y.*

Exhibited at Erie 1877.

UNIV. OF MICH.

because they are not supplied with a first-class article. Let our market be kept supplied with gilt-edged cheese, such as is the choice of shippers, who know the tastes of their customers, and we may easily double our home consumption in a single season, and in a very few years create such a demand at home that we shall have little to spare to feed our brother Englishman, except by greatly increasing our product, which can easily be done.

There are very few families that cannot be induced to more than double their consumption of cheese at once, by supplying their grocers with a first class article.

This is a question of much importance, and worthy the careful consideration of every factory man and dairy man in the land. In fact this is the broadest, straightest, and easiest "way out" of the evil of over-production, which is, after all, only under-consumption.

Another and the last way out that I have time now to mention, is by keeping better cows, and taking better care of them, thus doubling the average yield per cow from all the dairies.

That this may be done, has been proved by the success of those few dairymen who have made it a point in their management to buy or keep only the best cows, and only while they remained at their best, at whatever apparent cost. These men have proved that while a good cow may be cheap at $100, because even at this price she pays a profit, a poor cow is dear as a gift, because she cannot pay for her keeping.

If every cow that cannot be made to produce four thousand pounds of milk in six months, were to be converted into beef this winter, and the beef given to the poor, the dairymen of America would be richer next fall as the result. No man can afford to milk a cow for twenty-five dollars a year.

We know that in many cases the fault lies less with the cows than with their management. In these cases the less is the farmer deserving of sympathy, for at the present day there are so many helps available, that he is not excusable if he will not learn to deal justly and liberally with his dairy.

THE PRINCIPLE OF HONESTY MUST BE OBSERVED.

Nobody denies, that in a general way, and under many circumstances, "Honesty is the best policy." In fact, the chances of success, fully evading the sharp eyes and quick perceptions of suspicious neighbors, who are ever watching us, are so slim, even with the utmost precaution, that it is a safer line of policy to be pretty near honest, and it requires no labored argument to prove it.

The horse thief who falls into the hands of the sheriff and suffers the penalty of the law, receives little commiseration for his punishment, because everybody says, "He knew what he was risking, and went into the business with his eyes open."

The cheese factory patron who, to increase his unjust gains, stealthily rises with the first dawn of the morning, and proceeds to his barn with a quantity of water, pouring it noiselessly into his milk can, when he finds that his every movement has been observed by the factory detective, who lay silent and motionless as death upon the hay-loft, comes suddenly to an instinctive perception of the fact that, "Honesty is the best policy," and his convictions are liable to grow clearer, deeper, and more profound, as he finds himself convicted under the law, and called by his right name.

This may seem rather a low view to take of a great moral principle, and so it is; but the conviction forced upon us by observation and intercourse with the world, is, that this is the view taken by a very large class of the people with whom we are called to deal.

In large matters, matters recognized by the law as crimes, with penalties attached, all agree it is best to be honest; but how many of us are accustomed to carry the same code into the minor details of our dealings with men?

If it is obligatory between copartners to study the interests of the concern, rather than selfish interests, and to make less, rather than more, of each other's faults and mistakes, for the same reasons of mutual interest, it is policy for patrons of factories to be honest with each other in respect to watering or skimming milk not only, but in respect to the food and care of cows, to secure the production of milk of fine quality, and to the care of milk before it is taken to the factory.

The patron who starves and neglects his cows through the winter, allowing to them become poor and weak, and when the milking season opens, feeds them with slops and bran mashes to increase the bulk of milk, without care for its quality, thereby defrauds not only his brother patrons, but the cheese maker, who is able from such milk to produce only a pound of cheese from twelve instead of ten pounds of milk, and whose reputation suffers by comparison with his more fortunate, but not more skillful, competitors, who are provided with a better grade of milk.

When we consider the true policy of honesty, as applicable to dairymen, we enter a field prolific in valuable suggestions, upon which it is well to reflect carefully and candidly.

The legitimate relations between the several classes whose interest centers in the dairy industry, and the mutual obligations growing out of these relations, are proper themes for intelligent consideration and discussion.

The fact is, there is so much of the prosperity of each class depending upon the prosperity of others, that we can scarcely come to any other conclusion than that, if each could be induced to labor directly for the general welfare, they would thus adopt the most certain means of securing their own.

Every effort of the dairyman to improve herds in productiveness, by careful breeding and selection, or more liberal and judicious feeding, or to secure the better condition of his milk on delivery, by thorough æration and cooling at the dairy, every effort by the cheese-maker to improve the quality, and increase the yield of his product, and to enhance its attractiveness by better care in the curing-room, and putting it up in more tasteful style for shipment, or to strengthen the popular faith in his calling by speaking well of his competitors, every effort by the buyer to stimulate to a higher and more uniform standard of quality, to impart needed and useful information respecting the wants of the better class of consumers, and so to bring the supply to the level of the demand, or to open and develop new avenues in commerce. These, and all kindred labors, are legitimate, and will surely be rewarded whenever prosecuted in the spirit of honest enterprise.

On the contrary, every attempt of a patron to defraud his neighbor by stealing out cream, or by stealing in water, or to discourage any from imitating his more prosperous neighbor, who is known as a liberal feeder, to instigate distrust of his neighbor, or of the manufacturer, by throwing out false or doubtful insinuations against his integrity; every effort of the manufacturer to encourage distrust and partisanship among his patrons, or on a more extensive scale among factories, or to get ahead of a competitor by destroying his business in any way, as by magnifying his mistakes or misfortunes. Every effort of a dealer to weaken a competitor by hints and inuendos concerning his financial standing, or to create a corner in the trade for the purpose of crushing him out, or in any way to tear down a competitor and build upon his ruins, is illegitimate and dishonest, and tends to the destruction of one's own interests, by destroying that upon which his prosperity depends, and out of which his success must come, if it come at all.

These are kindred acts, antagonistic to the general good, and as really infringements of the code of honesty as the more glaring and popularly recognized acts known to the law as crimes, and punished as such; and wherever the spirit of dishonesty prevails, success will be slow and unsatisfactory.

There is scarcely another occupation that calls so loudly for unity of spirit and of action, in which the interests are so emphatically mutual, as that of the dairy; and to put it very mildly, it seems as if there were among its followers enough of bitterness, jealousy, and greed, to block the wheels of progress entirely.

These things ought not to exist, and when we come to take broader and truer views of our various interests, and apply them in business, they will no longer exist.

Under the wholesome influences of associated dairying, dairymen's associations, and dairy literature, many important advance steps have been taken, and we may reasonably expect to see dairy enterprise come up to a higher moral standard, and attain to a degree of prosperity that shall, in a measure, atone for the friction by which the evils of the present shall have been overcome.

A liberal interpretation of the text, "Honesty is the best policy," will enable us the more speedily to find our way out. We must learn to "live and let live."

The manufacturer of fabrics, or of farm implements, or of anything you may please to mention, save the products of the dairy, regards the buyer of his wares as his best friend, and strives, by every means, to court his favor and friendship, and thereby secure his patronage.

Not so the dairyman. He trains himself to consider the dealer as his mortal enemy. He views him from afar, with head turned and eye fixed with terror, very like a chicken under the evolutions of a soaring hawk. How great cause he has for this sense of terror, we will not stop to argue. At first thought, it does seem to the unthoughtful as though the "pestiferous middleman" were merely a parasite, existing and subsisting upon the producer and devouring his substance, and rendering no equivalent for his subsistence.

But is this the fact? If it were so, there would be no excuse for the producer for not starving him out entirely. The fact, however, that all efforts to starve him out have, thus far, only resulted in damage to his assailants, would seem, of itself, to prove that the poor middleman is not, after all, an unmitigated evil.

But to the more reflective, it is clear that the relations of manufacturer and dealer in dairy products, as in other departments of trade, are really not antagonistic, but mutual. Neither can exist without the other, and neither can truly prosper, except under conditions that secure the prosperity of the other. In the ebb and flood of market values, were it possible for the dairyman to secure all the advances and throw all the declines upon the buyer, in any single season every dealer in the land would be extinguished. What then would be the future prospect of the dairyman?

Having starved his brother, who had opened up the markets of the world and brought them to his door, thus enhancing the value of his products and converting them into cash, which only the dealer could do, he has shut up every avenue for the consumption of his wares, and nothing is left him but to "cheese it" till he is surfeited with cheese.

On the other hand, could the dealers secure to themselves all advances, and put all losses upon the dairymen, production would cease and trade vanish. Where then would be the occupation of the greedy middleman?

But, fortunately, the law of nature is not a dead letter in commerce, and the rule of "the survival of the fittest" preserves the forces on both sides of this apparent antagonism. In times of special depression, as in the past and present seasons, the pressure is brought to bear about equally upon both seller and buyer. If the dairyman has seen close times and realizes small profits, so has the income of the dealer been reduced to a minimum, and his hopes of speedy affluence have grown beautifully less.

And now, as the tone of the market improves, and the revival of various great industries leads us to hope for better days and better prices, let us not be unwilling that those whose prosperity is essential to our own, should reap their due proportion of any advances that may possibly come. I protest against the indulgence of this spirit of suicidal greed that prompts the dairymen to grudge the buyer the legitimate profits arising from advances while goods are on his hands. This spirit is far to prevalent among dairymen, whose grumbling and fault finding with the sales man for sales that were made honestly and in good faith, but happened to be followed by an unforeseen advance, too often induce him to growl or quibble, and attempt to partially or wholly violate his contract.

Cases of squarely backing down from positive and explicit verbal agreements because they are "only verbal agreements," are alarmingly and shamefully common. While the buyer is universally held to his bad bargains most rigidly, and gets no favors, because "he is a business man and must expect to take care of himself, or suffer the consequences," the sales man is too apt to be led, by the grumbling and quibbling spirit of his patrons, to regard himself as worthy of great consideration in any sale that fails to secure to his own side every dime of an advance.

Fortunately, in most states it is not required that a bargain, to become valid in law, should be made great with formality, but every distinct agreement, verbally or otherwise made, is held to be obligatory upon the parties.

The importance of properly curing cheese is almost overlooked by many manufacturers, and fully appreciated by very few.

There are very few that regard the curing as a part of the manufacture, and take that pains in providing facilities for the curing which is taken to provide the best facilities for other parts of the manufacture.

The proper curing, or cooking, as it is termed, of the curd while in the vat is not more important to the ultimate character of the cheese than the final curing after it comes from the press.

We hear it argued that a mess of curd pressed into the form of a cheese is cheese when first taken from the hoop. This is no more true than that a calf is an ox, or that veal is beef, or that a chicken a day old is a hen, or that an egg is a chicken.

Curd is essentially curd, whatever its shape may be, and certain chemical changes in its constituent parts are required to render it cheese. The difference between a piece of curd and a piece of cheese of the same size and form is caused by the fermentation which has taken place in the one and not in the other. The rapidity of fermentation determines very largely the quality of the cheese, both as regards flavor and texture, but especially the former.

Heat is the principal agency by which fermentation is regulated, though it is also greatly modified by the condition of the atmosphere in respect to dryness and purity. Take four cheeses from the same vat of milk, right from the hoop. Put one in a cold damp cellar, one in a hot dry chamber, one in a warm damp room, and one in a dry cold room, and when these cheeses are thirty days old they would not be recognized as ever having seen each other, and time will only render them more and more unlike.

Many a cheese well made in other respects, is utterly ruined in flavor by being kept two weeks, while new, at too low a temperature, becoming sour, bitter, and unpalatable. And the worst of the case is, it can never be redeemed from this ruined condition by any subsequent treatment. The most desirable results come from a proper degree of heat, early and constantly applied, and in an atmosphere neither too damp nor too dry.

It is a pretty well established fact, verified by the experience of all who have tried the experiment carefully, that where the atmosphere of the curing room is too dry, the cheese will keep in a neat, clean, handsome condition externally, and with little labor; yet the more tender curds will have a tendency to crack, while internally the tendency is toward toughness and dryness of appearance, as of a lack of stock, the oil and the caseine not being perfectly united.

Besides, the flavor of such cheese is likely to be very uncertain and not fine, and the shrinkage heavy. On the other hand, cheese made from the same curd, cured in a room where the atmosphere is somewhat damp, and the temperature uniformly favorable, say about 70° to 75°, will mould externally, and require more labor to keep it bright, will have little or no tendency to crack, and internally the texture will be fine, the caseine thoroughly incorporated with the oil, without any appearance of dryness, the flavor pure and pleasant, and the shrinkage comparatively light.

During a large portion of an ordinary season, the difference in value of cheese, equally well made in other respects, but cured by the two methods, will frequently be greater than the manufacturers' charges, and yet it is one of those things that can not always be demonstrated so as to be clear to the minds of those most interested.

It is somewhat like the degree of skill of physicians, or the efficacy of a medicine—a result is apparent, but we can not positively determine by what agency the given result was produced.

The amount of loss annually sustained by the dairymen from this cause alone, would go far toward paying the taxes on their farms. This, like a loss by fire, is a loss of value that profits nobody, but entails only loss and dissatisfaction to all concerned. The actual immediate loss falls upon the owners of the milk, while the manufacturer suffers in his reputation for skill, and is compelled, often, to bear the blame of his patrons for a loss which is entirely beyond his control.

There are many reasons why a large portion of the cheese made is so imperfectly cured, but the first and immediate reason is the wretched condition of the curing-rooms. Scarcely one factory in twenty has a curing-room that is well adapted to the purpose.

They are so poorly inclosed, and the protection against the elements so inadequate, that there is a constant variation of temperature and moisture.

In hot days, the room is hot; in cold days, it is cold; in wet weather, the atmosphere is damp, and in dry weather it is dry. These sudden changes affect the quality of cheese seriously, and should be avoided, by having the room so inclosed as to render it, as little as possible, susceptible to sudden changes. One of the fruitful causes of cracked cheese, is change of temperature from warm to cold. When the cheese is at a temperature to cure properly, it is somewhat expanded. If it be allowed to cool suddenly, the surface cooling and shrinking first causes the surface to crack, even when there is no fault in the curd.

Day and night the room should be kept, as nearly as possible, at the same temperature.

I know but two rooms that I regard as well adapted to curing cheese in all weathers. One of these is a basement, with walls of stone, lathed and plastered, there being a space of four inches between the lath and the stone wall. Being well ventilated, and provided with a stove, for use in damp and cold weather, this is almost a perfect curing-room.

The other is ceiled up at the sides and overhead, and the space of four to six inches filled with sawdust, and is also well ventilated and provided with a stove.

In this room I have never yet found any cheese poorly cured.

The basement or cellar, cannot be provided at every factory, but the ceiling and filling can be done at any factory, and is not very expensive.

Why are not these carefully prepared rooms more common?

There are two great reasons why. One is, the proprietor of factories do not generally appreciate the importance of the matter; and the other is, those who do, reason that, as the cheese is not their own, and patrons are so slow to appreciate favors, it will not pay them (the factorymen) for the trouble and expense. And this last I believe to be the chief reason. A general improvement in this respect cannot be effected till manufacturers are made to realize, not only that it will pay their patrons, but that it will pay them. And this opens up again the whole field of the relations of patrons and manufacturers to each other.

No doubt it pays the manufacturer to consult, and secure as far as consistent, the interest of his patrons, but the instances where patrons prove their sense of obligation, for any special favor or expense on his part, by a steady and devoted patronage, are so rare that it is not strange we see so many tumble-down factories, where everything seems to be going to ruin as fast as possible, and no ambition manifested to prevent it.

It is one of the saddest features of factory experience, that there is nothing in the treatment received by most of the manufacturers to encourage enterprise, nor even to prompt them to keep their factory and fixtures in decent repair, however fully they may be persuaded, that the true interests of their patrons require constant improvements. Without the constant exercise of an enterprising spirit, there is no progress to be attained.

The expense of converting the present rooms of almost any factory into real curing-rooms adapted to the purpose, would be something of an item to the manufacturer, but it would be saved by his patrons in the better quality and enhanced value of the product in a single season.

Of this fact, those who have observed closely, can have no doubt.

The few rooms of this character now in use, have given entire satisfaction, and proved the correctness of the theory.

Especially are they valuable in curing the early and late made cheese, saving fuel and rendering the cold weather cheese soft, sweet, and palatable, free from the acid flavor, and salvy texture so common in cold weather.

When these topics upon which I have touched, shall receive such consideration by the common dairymen of our country, as they are receiving by our foremost dairymen, the time will draw near, when we shall not be inquiring what we shall do to get out of the troubles that now environ us, but these troubles will have passed into history as the things that were, but are not, and the farmer shall become in fact the most prosperous man in the land.

PENNSYLVANIA STATE DAIRYMAN'S BOARD OF TRADE.

L. C. MAGAW, *President*. S. B. DICK, *Treasurer*.

RULES AND REGULATIONS.

1st. This organization shall be known as the Pennsylvania State Dairymen's Board of Trade.

2nd. Its object shall be the development and improvement of the dairy interest, by providing better facilities for the sale and disposition of dairy products. Its officers shall be a president, a secretary, and a treasurer.

3d. The payment into the treasury of two dollars shall constitute a membership to this board for one year.

4th. Members may be assessed, if necessary to defray expenses, to the extent of three dollars additional to the membership fee.

5th. Members only are entitled to the privileges of the salesroom.

6th. There shall be a bulletin board arranged, in a conspicuous place in the room, upon which shall be posted the latest market reports and other important information, and all members may post upon said board a notice of any dairy products they may have for sale.

7th. It shall be the duty of the president to procure all needed market reports and place them upon the bulletin board, and to issue tickets of membership.

8th. All bargains made between members, at the salesroom or elsewhere, verbally or otherwise, shall be binding upon the parties thereto, and a failure of either party to perform his or their part thereof shall be considered a sufficient cause for expulsion from this board.

9th. In case of difference between two parties or interests, there shall be a board of arbitration constituted, for the purpose of hearing, adjusting, and settling such difficulties as may arise, from time to time, between buyers and sellers. And it is expressly understood that such settlements, by such board of arbitration, shall be final, and adhered to by the parties to the dispute. The method of choosing such board shall be as follows, namely:

The parties in dispute shall each choose one member of this Board of Trade, and the two members thus chosen shall select a third, and these three members shall constitute the board of arbitration, and shall have appropriate jurisdiction.

10th. It is understood that when a factory has more than one salesman, either or all of them may be admitted, for the purpose of selling factory products only, on presenting the factory's ticket of membership. Also, the buyer and his agent may be admitted on one ticket, and it shall be proper for a member to be accompanied by a friend or neighbor not interested in buying or selling without extra charge, but any violation of this courtesy will be deemed a breach of the rules of the board.

11th. All transactions should be put upon the bulletin board, that a correct record may be kept by the secretary.

12th. Any member may be entitled to a copy of the telegraphic market reports. And the secretary is instructed to send the same to absent members who shall request him to do so.

In all sales of cheese, where no express stipulation to the contrary is made, it is to be understood that the salesman guarantees weights in New York, and the certificate of the regularly appointed weigher shall be the basis of settlement if such test shall be made within eight days from the date of shipment.

13th. Amendments to these rules and regulations may be made at any regular meeting of the board, by a majority vote; provided, notice of the proposed amendment shall have been duly given.

By an amendment, there is no permanent secretary, a secretary *pro tem* being chosen at each meeting of the board.

ORIGIN AND HISTORY OF THE PENNSYLVANIA DAIRYMEN'S BOARD OF TRADE.

About the year 1870, it may be said, the cheese factory system began to plant itself in earnest in Crawford county, and like every new enterprise, as it grew, and as its products multiplied, new wants and needs presented themselves, and new methods must be adopted to meet the new demands.

One of the serious problems was how to market the product after it was made and ready for market. The factories, to be sure, were visited promptly and frequently by buyers, but salesmen began to suspect that the buyers had more definite and intelligent ideas of the condition and tendencies of the market than they had themselves, and began to inquire how they could obtain the necessary information, to enable them to guard their own interests better, in the matter of sales.

It was then no uncommon thing for a shrewd salesman, shrewd in his own conceit, to refuse all offers for his cheese, carrying his entire make, perhaps, through the season, and sometimes till well into the winter. Occasionally this plan proved profitable, in those days, but recently there has been a growing market demand for new cheese, from ten to thirty days from the hoop, and the early and hot weather make, if carried till fall, is left almost without a market.

The question when to sell, and how to sell, therefore, became the all important one to the salesman. By degrees, it came to be more than suspected that the buyers were not only careful not to pay more than cheese was worth, but were not likely to pay, in any case, more than the seller asked, not even if they knew they could afford to do so. The man who overvalued his goods, would fail to sell at the propitious time, and he who undervalued his, would sell too cheap.

The one mistake was about as common as the other, and the buyer appeared to be getting ahead. Meanwhile, the dairymen of Central New York had organized dairy boards of trade at Little Falls and Utica, which seemed to be working a great revolution in trade, and the inequality in prices between the Pennsylvania dairyman and the New Yorker became too great and too apparent to be quietly endured. The idea of trying to establish a like organization at Meadville, the geographical center of the Pennsylvania district, was mentioned from time to time, at the meetings of this association, and, by those who had great faith in the future possibilities of the interest, it was urged that a dairy board of trade, sustained by the dairymen, would prove to be the one thing needful. The suggestion was, at first, received very coolly. The native suspiciousness of the Pennsylvanian was, for a time, sufficient to prevent all enthusiasm. It was gravely feared that the board of trade would be manipulated by the buyers, who would lay their heads together to entrap the unwary salesman, so that his last state would be worse than the first.

By slow degrees, however, the measure gained strength, and at a meeting of the association, held during the spring of 1875, measures were instituted to secure an organization.

It is due to the president and secretary of this association, who are not dairymen, and had no selfish interests to subserve, and to the local buyers, of whom the secretary is one, whose interests, if anybody's, would be expected to suffer from such an organization, to say that from the first they ranged themselves on the broad ground that whatever would stimulate the production of finer qualities of goods would be an actual benefit, not to the producer alone, but to the dealer, also, by affording broader outlets, readier sales, and thus lessening the risks of trade. They believed the board of trade would produce these results, and, therefore, cast their influence in its favor. In fact, had it not been for the pioneer work of the few persons above named, the Pennsylvania Dairymen's Board of Trade would never have been born.

The apathy and distrust of the popular mind among dairymen, the very class to be benefited by it, would have frozen it to death in embryo.

Yet there were not wanting among the leading proprietors a few sagacious minds, who early favored the movement, and labored earnestly to convert their neighbors to the true faith, and are entitled to large credit for their persistent efforts in this direction.

The establishment of the board of trade was the beginning of a new era for the dairy interest of Western Pennsylvania. As a means of comparing results and interchanging idea, thus leading to a higher standard of workmanship, by holding up before the workmen better models, the institution has been a success.

Farmers will not take the time and trouble to attend a meeting weekly, simply to discuss questions concerning their occupation, but by introducing a more potent magnet, immediate pecuniary profit, in the form of a cheese market, they are drawn together with great punctuality.

And it has been from the first one of the features of the Pennsylvania Dairy Board of Trade to devote the first hour of every session to discussion of such topics as circumstances should, from time to time, present. This has been an hour of interest and profit, and the members would not now be deprived of this opportunity for the interchange of views and sifting of the true from the false, this opportunity to correct errors and disseminate useful information, than they would go back to the old methods of dairying.

The hour's session for formal talk is a feature, I believe, which belongs distinctively to this board, and which renders each meeting one of importance to the members, but yet it does not in any sense take the place of or detract from the popular interest in the regular stated meetings of the association, which, while it is the parent of the Board of Trade, and fosters it, is yet a distinct and separate organization, and separately officered. Neither organization is in any way responsible for the acts of the other, but both work in perfect harmony, having one common end in view, namely, the elevation of the dairy to its proper position among the industries of America.

The Board was organized in the spring of 1875, having a membership of fifty-five. Under its rules, the products of about fifty factories were sold.

The rules of the board do not require members to sell their products only at the market, they may sell at any time during the week, but there are many members who will not sell, except on the regular sale day. On this day they feel morally certain that they are as well informed in regard to the market as the buyer; on other days changes may have taken place, of which they may not be advised. The sales are effected by private "dickering" between the buyer and seller, with little reference to anything except the quality of the goods offered, and their market value. Since the establishment of an authorized weigher of cheese in New York city, whose test of weights of the cheese, on arrival, is regarded by the dealers and exporters as conclusive, it is the custom of factories to "guarantee weights in New York, and abide by Hardy's certificate of test." The method of testing weights is this: Five cheese are taken promiscuously from a lot, each cheese, of the five, is turned out of its box and weighed "naked." If either party demands it, five more, or ten in all, of any lot, may be weighed, and the whole lot is avereged by these five or ten. If one of five is one pound short, the certificate states the fact, and the lot is said to be "one fifth short," which means one pound short on every five boxes of the lot. If ten cheese are tested, and three are short each a pound, three prove to be exact, and four weigh each a pound more than they are marked—the bill reads, "one tenth over." Three short weights being balanced by three overweights, and the fourth overweight is shown in the sellers favor. The weighing is done by the steelyard, the most exact of all scales. It is admitted that neither buyer nor seller, in New York, ever questions the accuracy of these tests.

I have been thus particular on the subject of weights, because there are many readers of this report who may have vague or erroneous ideas concerning the method by which the accuracy of the marked weights of cheese is tested. It is true, that country salesmen often feel wronged by these tests, but when they go to New York, and see their cheese weighed, they return home feeling satisfied of the entire honesty and fairness of the tests made. The weigher being chosen as a disinterested party, to put an end to the ceaseless disputes that formerly existed, between receivers and exporters.

This result has been effectually accomplished, and the weighmaster now stands as an authoritative arbiter, on the matter of weights, between buyer and seller.

THE FIRST DAIRY FAIR.

The first fair held in the United States, for the sole benefit of the dairy industry, was held at Meadville, on the 23d, 24th, and 25th of October, 1877. It originated in the Board of Trade, and was conducted under its auspices. This fair was a signal success, especially when it is remembered that it was a pioneer movement, originating, not in the heart of the great dairy region of New York, where circumstances would have been more favorable, but in a comparatively new, and, therefore, not fully developed section. The end sought was the greatest good to the greatest number, or, in other words, the advancement of the general interest, rather than the granting of prizes to a few lucky ones in a lottery. And, therefore, it was regarded as extremely fortunate that Professor Arnold's services could be secured as judge.

The idea was to select the best models from amongst the exhibits, and hold them up as models, to stimulate efforts to equal them, and thus raise the general standard. How far the efforts put forth shall prove successful in this direction, the future only can show. But, as an indication of the probabilities, I will quote from the daily *Republican*, which said:

"The dairy fair, which began here on Tuesday morning, closed most satisfactorily, last evening. The attendance on the first two days was large enough, and Thursday it filled every portion of the market-house within hearing distance of the speaker's stand, for some hours, so that it was impossible for sight-seers to get through. The excitement to hear the report of the judges, and their conclusions and opinions as to the relative merits of the different exhibits, was intense, and scarcely one fourth of the persons present could get within ear-shot of Professor Arnold, who was reading the report.

"The judges were Professor L. B. Arnold, of Rochester, N. Y.; Mr. J. G. Cahoe, of Chautauqua county, N. Y., and L. C. Magaw, president of the Board of Trade, of this city.

"The following States were represented: New York, Wisconsin, Pennsylvania, Illinois, Missouri, Iowa, Kansas, and Vermont."

The report of the judges was rendered quite at length, with the view to showing up the merits and demerits of the exhibits which were awarded premiums.

ENTRIES—CHEESE.

Class 1—Full Cream Factory—22 Entries of Five Each.

Factory.	Entered by.
Rundletown,	G. F. Webb.
Milledgeville,	J. Foulk.
Mount Hope,	P. Monroe.
Guy's Mills,	J. Hotchkiss.
Owen's Corners,	Eighmy & Dyer.
Conneautville,	H. McGuire.
Dicksonburg,	Hammon & Son.
Findley's,	S. H. Findley.
Hotchkiss,	Hotchkiss & Hotchkiss.
Cole's,	John Cole.
Nash,	William Nash.
Gibson's,	D. H. Gibson.
Holman's,	J. G. Holman.
Woodcockboro',	H. Williams.
Summit,	Fuller & Rice.
Warner,	M. P. Lewis.

Factory.	Entered by.
Cochran Farm,	T. C. Cochran.
Spring Valley,	H. C. King.
Townville,	A. T. Squires, maker, L. & B. Lamb.
West Union,	G. W. Carroll.
Wells, Vermont,	W. W. Ingram.
Langs, Wisconsin,	W. W. Ingram.
Oakfield, Wisconsin,	W. W. Ingram.
North Aurora, Illinois,	W. W. Ingram.
Linesville,	Griffing & Tisch.

Total entries in this class, 113.

Class 2—Home Trade Cheese.

Entries, five cheese each, except Palmyra, Missouri, 2; Centralia, Kansas, 2; Waldo, Wisconsin, 4.

Rundletown,	G. F. Webb.
Cochranton,	D. H. Nidine.
Sugar Creek,	S. Matson.
Palmyra, Missouri,	W. W. Ingram.
Centralia, Kansas,	W. W. Ingram.
Gibson's,	D. H. Gibson.
Holman,	J. G. Holman.
Summit,	Fuller & Rice.
Waldo, Wisconsin,	C. M. Waldo.

Total cheese in this class, 38.

Class 3—Skims.

Entries, five cheese each, except Rock River, Illinois, 2 cheese.

Watson's Run,	Harper & Beatty.
Venango,	Doctor & Sherred.
John Brown,	H. Burlingame.
Clipper,	Gerow & Klei.
Rockdale,	H. W. Canfield.
Blooming Valley,	G. Bentley.
Rock River,	W. W. Ingram.
Franklin Creamery,	B. Franklin.
Gibson's,	D. H. Gibson.
Hall's,	Ira Hall.
Warner,	M. P. Lewis.
Porter's,	William Porter.
Woodcock Valley,	J. B. Baumbach.

Total cheese entered in this class, 62.

Class 4—Sweepstakes.

Entries, 10 boxes of cheese each, except Cole's 12 boxes. Each entry representing ten days' product.

Hotchkiss,	Hotchkiss & Hotchkiss.
Cole's,	John Cole.
Nash's,	William Nash.
Gibson's,	D. H. Gibson.
Holman's,	J. G. Holman.

Total boxes entered in this blass, 52.

BUTTER.

Class 1—Factory Butter.

Each entry consisted of one tub.

John Brown Creamery,	H. Burlingame.
Clipper Factory,	Gerow & Klie.
Blooming Valley,	G. Bentley.
First Fremium Factory,	D. H. Gibson.
Franklin Creamery,	B Franklin.
Hall's,	A. Hoyt, maker.
Porter's,	William Porter.
Rockdale,	H. W. Canfield.

Total, 8 tubs of butter.

Class 2—Dairy Butter.

George Spitler,	Crawford county.
J. L. McWilliams,	Erie county
Peter Wickham,	Crawford county.
James Harris,	Crawford county.
H. Crom,	Crawford county.

Total entries, 2 tubs, 2 jars, and 20 pounds of roll.

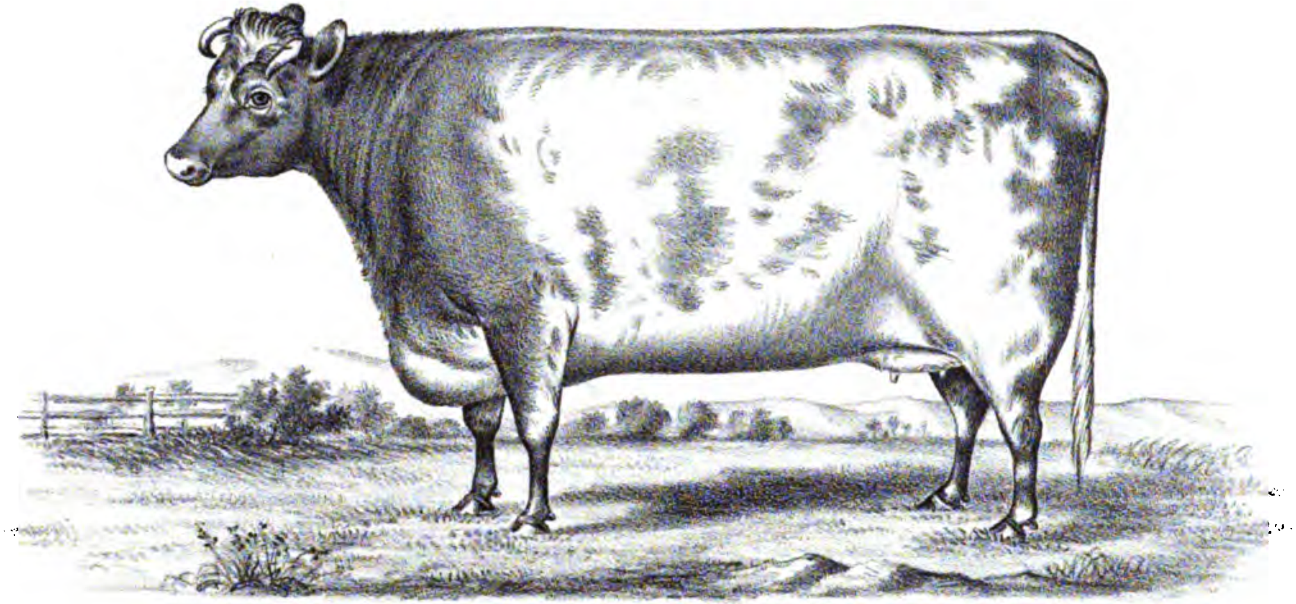
Total entries of cheese,	260
Total entries of butter,	14
Total entries,	274

PREMIUMS AWARDED.

Class 1—Full Cream Cheese.

Woodcock borough, Pa., 1st premium,	$25 00
Mt. Hope, Pa., 2d premium,	15 00
Hotchkiss, Pa., 3d premium,	10 00
Owen's Corners, Pa., 4th premium,	5 00
Linesville, Pa., 5th premium,	3 00

UNIV. OF MICH.



"HIGHLAND QUEEN"

Class 2—Home Trade Cheese.

Waldo, Wis., 1st premium,	20 00
Holman, Pa., 2d premium,	10 00
Rundels, Pa., 3d premium,	5 00

Class 3—Skims.

Gibson, Pa., 1st premium,	20 00
Venango, Pa., 2d premium,	10 00
Chapinville, Pa., 3d premium,	5 00

Class 4—Sweepstakes.

John Cole's factory, Cussewago, ten days' product,	25 00

BUTTER.

Class 1—Factory made.

Clipper, Pa., 1st premium,	$10 00
Franklin, Pa., 2d premium,	5 00
Blooming Valley, Pa., 3d premium,	3 00

Class 2—Dairy Butter.

Peter Wickham, Crossingville, 1st premium,	10 00
James Harris, Mead, 2d premium,	5 00
J. L. McWilliams, Waterford, Erie county, Pa., 3d premium,	3 00

During the session of the fair, the following address was delivered by president Magaw:

ADDRESS OF LEON C. MAGAW, PRESIDENT, PENNSYLVANIA DAIRYMAN'S BOARD OF TRADE.

GENTLEMEN: I am requested by the Board of Trade, to make some remarks at this time. I wish it were in my power to deliver an address worthy of the occasion. It is perhaps my duty, however, as presiding officer of the Board to say something, and I will ask your attention for a few moments only. I desire in the first place to make a few remarks in relation to the organization of the Board of Trade. I do so for the reason that while I *know* there are those who fully understand its working and benefits, there may be others who, perhaps entertain the idea that little or no good is derived through the organization.

Boards of Trade are in existence in all the principal cities of the United States, not that I claim Meadville as one of the *principal cities* by any means, but owing *to the large amount* of dairy products manufactured near it, it becomes necessary that this organization should exist. In those cities where large amounts of produce are bought and sold, these organizations are indispensable, and their daily transactions are at times immense.

The Board of Trade in this city was organized for the benefit of the patrons of cheese factories. I would like this distinctly understood. I mean by patrons of cheese factories, those persons who furnish milk—the raw material from which the butter and cheese is manufactured. I say the board was organized for their benefit, and I desire that this should be distinctly understood, for the reason in the first place, that it is correct, and secondly, for the reason that there may exist in the minds of—I hope but few—the impression that the organization was gotten up for the benefit of a few individuals. There is no intelligent man capable of showing such to be the case. If such were the case, certainly the officers should reap a goodly portion of this individual benefit. Let us look into this: The officers consist of a president, scretary, and treasurer; these persons receive for their services at the expiration of the season, *the thanks of the board*, and we know feel fully compensated. The room occupied by the board is kindly furnished by the city authorities—at present by the Messrs. Delamater. In fact, the janitor is the only one who receives pay for services, his duty requires him to take care of the room, see that it is in order, and opened on days of meeting, also, that it is left properly locked, &c.; for said services he receives twenty-five cents a week, and therefore notwithstanding he is the only one under pay, we can hardly say he reaps a large amount of benefits. The *sole* purpose of the Board of Trade is the same here as in other places, being for the sale and purchase of products *at their market value*, that is the point, *their market value.* There *is a certain* amount placed upon any article man has to dispose of, and this amount is not only peculiar, (quite so at times,) but has *always* been the same, and no doubt naturally will be till the end of time; this amount being *all* that one can possibly get, and that too without regard to its *real* value. All articles, however, in commercial intercourse, must have a *market* value, and at this valuation only is the article expected to change hands. If an article is placed upon the market at a price *above* the market estimate, the consequence is, it is unsaleable, and therefore will not exchange hands. On the other hand, if the price is made *below* the market value, (and this no doubt would be for the want of proper information,) then the article is quickly taken at a loss to the salesman, and an extra gain to the purchaser. Any salesman of sound reason certainly desires, and is justly entitled to the full market value of the product he offers. It certainly therefore is of vital importance that he should be well informed and know its correct market value, and *realize* its full benefit. I take for granted that all patrons of cheese factories desire the full market value of their product, and if so, it is certainly important that the salesman representing the same should be fully informed up to the moment of his offer. The members of the board are in the majority, the salesmen representing the different factories, the buyers also are members, in fact, it becomes necessary that they should be, in order to make purchases on the board, as it is termed, at that time and place. These gentlemen represent the interests of eastern capitalists, and necessarily should be intelligent men, of sound judgment, pleasing manners, and prompt in their allegations, and such they are. These gentlemen are at all times ready to take the product at its market value, *and always below it*, *remember if so offered by the salesman*, of course it is their privilege, and in fact we may say their duty, so to do. Buyers are always posted up to the moment they make their offers, the sudden changes of but a few hours previous, they are fully informed of, and they do not intend to buy at a fraction above the market value. Why is it not just as important that the salesmen should know the value of the the product they offer? Certainly it is. The Board of Trade, through its arrangements, is thoroughly posted as to the market, particularly so on the day and hour it meets. Any salesman can know just what his butter or cheese is worth; if he asks the market value it is taken.

The gain in sales, through the board of trade, has amounted to many thousands of dollars over the random mode of selling, as it might be called.

Instances (and quite a number of them) are known of salesmen, not members of the board, who have sold much below the market value, and this because of lack of information. The saving of two dollars for membership has resulted in the loss of thousands of dollars.

Not only are the members of the board benefited by the market information they receive, but also in their social intercourse with each other, for it is plainly to be seen that their desire is to raise the standard of the product they represent to the highest point.

During the Centennial exhibition last year, the members of the board desired that North-western Pennsylvania should be represented as a dairy section, that its product should be known, that notwithstanding Ohio and New York States, also Canada, would put forth strong efforts to represent themselves as prominent cheese producing sections, this locality should also be known as such. Through some (perhaps) false representations of mismanagement at Philadelphia, the board became discouraged and was about to give up the exhibition of our product. However, at the last moment they determined not to be left out, and two of the members purchased, at different factories, a sufficient number of cheese and took them on, placing them side by side with those already there. Not with the view that they would excell all others, but that it might be known that Crawford and its adjoining counties was not only rich beneath their surface, but that the very grass they grew could produce cheese in abundant quantities, and that thousands of boxes were weekly offered to eastern purchasers. What was the result of this effort put forth by the board, even at the last hour? Read those diplomas, they not only speak for the gentlemen to whom they were presented, but for our whole section of country. Who is ashamed of this North-western Pennsylvania as a dairy section, and for what are we here to-day, for what has the board of trade brought about this fair, this exhibition of dairy products? Why do they invite the United States and Canada to bring out their best make of butter and cheese, and show the same side by side with that of our own make; is it that we may show our own to be superior and take up the premiums we offer? Oh no, not at all. While we have faith in our desire to raise the standard of our product, we have also faith to believe there is room for improvement, and every effort we put forth to improve our product will help us to reach a higher standard, that is the idea. The higher the standard of our cheese, of course the more valuable they are, and, therefore, the greater amount is realized for them.

Our factory men do not claim that the cheese manufactured by them are superior to all others in America, but they do manifest a desire to bring their make so that they will not stand second to any in the market. Our factory men are men of that stamp, and they show their courage and enterprise in extending an invitation to all other factories, both in the States and Canada, to bring forward their best make and exhibit the same. They also select two gentlemen from New York State—gentlemen of intelligence, thoroughly acquainted with the science of the dairy. These gentlemen are instructed to give their decisions favorably towards the best make represented, and unfavorably towards that of inferior quality, also to point out the deficiencies or faults in the poorer qualities, and this our factory men ask in order that they may overcome any imperfections, and improve their product. You, therefore, see a right spirit manifested by our producers, and you also see the deep interest shown by the board of trade, through whose efforts and under whose auspices this exhibition is brought about. The board desire me to thank those citizens who so generously assisted them in the financial arrangements necessary at this time.

My friends, the progress in this section our State during a few years past is something we little thought of, and even now, staring us in the face, as it does, we hardly realize it.

It is but a short time since the cheese made in this section were of dairy make only. Such a thing as a factory for the manufacture of cheese was not thought of. The product then was carted over the country in search of purchasers. Tons were taken to the counties south of us and sold at a trifling amount compared with the prices of to-day's make. Many were barreled and sent East, until commission merchants were ashamed to show them beside the factory make of New York State.

Look at the enterprise to-day; look at our county and borders of adjoining counties, and see, here and there, the factories for the manufacture of cheese and butter. We hear places spoken of as being great business points, places of rapid growth and enterprise. Upon inquiry why they are, the reply often is, they are manufacturing cities, the manufacture of such and such articles carried on extensively.

Manufactories are often located in certain sections of the country, owing to certain advantages which are to be found, such as water power, cheap fuel, &c., and the raw material is often brought from some distance. With certain advantages, there is brought into action enterprise, without which all other advantages would be useless. In fact, enterprise seems to prove itself the greatest power. There are many manufactories situated throughout the country where there seems no natural advantages, but the enterprise which is put forth and exercised makes it a success.

Boots and shoes are manufactured in the Eastern States; in fact, along the sea coast. In those enterprising places have they any natural advantages? No; they take the coal used for power from our own State; they also purchase largely their stock to be made up from our State and our merchants, and sell to us the manufactured articles.

Why cannot we manufacture our own? It is because enterprise first took hold of this business in the East, and holds on, and even with our advantages, we could not compete with them.

The manufacture of white paper is carried on extensively in Massachusetts. Abundant water power and enterprise is brought so into use that other States, with greater natural advantages, cannot compete with her.

Enterprise in our Western cities, Chicago, for instance, is showing itself to be a wonderful power.

Our neighboring city, Cleveland, by enterprise, takes hold of the purchasing and refining of oil, and, notwithstanding they are upwards of a hundred miles away from where the crude article is produced, and with no natural advantages, still, with enterprise and capital, they form one of the strongest companies in the world, and control the article they manufacture, in spite of all opposition.

All manufacturers seem to be obliged to seek a market for their goods, and even then it is difficult, at times, to dispose of them. Their products are often sold on long credit, and extra inducements are often offered to those who will handle their goods.

Let us now look at the cheese factories of our section. Have they, in the first place, any natural advantages? Where is the raw material brought from? A great distance? No; but growing in abundance, rich, luxurious grass all around us. Is there any pure water to be found, so necessary in the case? Yes; on every man's farm. No cattle thirst for the want of this, and abundant quantity is also to be found wherever our factories are located. Is there a market for the manufactured products, and is the expense great in finding purchasers, and is it necessary to give long time in order to effect sales? To this we may say, the market and purchaser stand at the door, ready to take all the product; the cash is in hand, ready for payment.

You, therefore, see that the factories have every natural advantage which is desired. Nothing is needed but enterprise to carry the business along to a complete success. Do not understand that I mean that this enterprise should bs shown only by the factoryman himself, but also by the patrons. I fear there is some lack there. Don't discourage him by the lack of interest you should take. Do not ask or expect him to turn out a first class product, unless you furnish him with the proper material. Do not expect him to receive milk in an improper state, and convert it into good butter or cheese. Good management is important here, on all sides.

I visited a factory with a New Yorker, perhaps two years ago, and, upon going through the same, his first remark was: "What a waste of material. What a shame for a factory to turn out a product like this. The establishment seemed well located, everything in its construction seems proper towards turning out a good article, but the product seems quite the contrary." If we visit that factory to-day, how do we find it? *Closed;* not for repairs, but for the want of good management. Whether on the part of workmen or patrons, I cannot say. Certainly, in order to secure success, every one interested must work for the good of each other, and, by so doing, reap their own individual benefits.

'Tis true, mankind is peculiar, and it is often discouraging when we find some of our fellow-beings able to help themselves by helping others, but who, when approached with such suggestions, like snails or turtles, draw in their heads beneath their frail shells, and intimate that, individually they feel fixed. However discouraging as it may be, little sparks of enterprise dropped here and there, seem productive of good and glorious results.

Enterprise has worked the manufacture of dairy products, in this section, up to its present standard and profit; and nothing but enterprise, together with the natural advantages we already have, will carry us to a still higher standard. Our factorymen deserve great credit for the energy they have displayed, and the present apparent determination on their part to gain all the information in their power, with the view not to have their product surpassed by that of any other section.

The brief time required to increase the cheese product of this portion of Pennsylvania, from merely nothing to the millions of pounds now annually produced, as well as the satisfactory exhibit here made, attest to the enterprising and intelligent labors of Pennsylvania dairyman.

PRELIMINARY AND PARTIAL REPORT

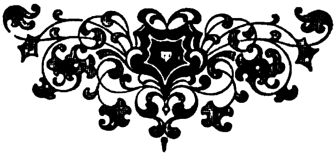
OF THE

Pennsylvania State Board of Agriculture,

PREPARED IN ACCORDANCE WITH A RESOLUTION OF THE BOARD,

BY

THE SECRETARY.



STATE BOARD OF AGRICULTURE, 1877.

MEMBERS EX-OFFICIO.

His Excellency John F. Hartranft.
General W. McCandless, *Secretary Internal Affairs.*
Professor J. P. Wickersham, *Superintendent Public Instruction.*
Honorable J. F. Temple, *Auditor General.*
Reverend James Calder, *President Pennsylvania State College.*

Appointed by the Governor.

		Term expires.
Honorable John P. Edge,	Downingtown,	1880
Colonel James Young,	Middletown,	1879
John L. George,	Monongahela city,	1878

Elected by County Agricultural Societies.

Berks,	W. G. Moore,	Womelsdorf,	1880
Blair,	Thaddeus Banks,	Hollidaysburg,	1879
Crawford,	M. C. Beebe,	Pleasantville,	1880
Centre,	Professor J. Hamilton,	State College,	1879
Chester,	Thomas J. Edge,	Londongrove,	1878
Cumberland,	C. A. Mullin,	Mt. Holly Springs,	1879
Lancaster,	H. M. Engle,	Marietta,	1880
Indiana,	G. W. Hood,	Indiana,	1880
Luzerne,	J. B. Smith,	Kingston,	1879
Mercer,	A. Robinson,	Mercer,	1878
Montgomery,	W. A. Yeakle,	Flourtown,	1878
Northumberland,	J. A. McFarland,	Watsontown,	1879
Schuylkill,	J. S. Keller,	Orwigsburg,	1878
Union,	J. W. Shriner,	Lewisburg,	1878
York,	W. S. Roland,	York,	1880
Tioga,	S. F. Wilson,	Wellsboro',	1879
Lycoming,	D. H. Foresman,	Williamsport,	1879
Franklin,	C. Gilbert,	Chambersburg,	1880
Lehigh,	J. P. Barnes,	Allentown,	1878
Bradford,	L. J. Culver,	Towanda,	1880
Warren,	J. H. Hiller,	North Warren,	——
Juniata,	Professor D. Wilson,	Port Royal,	1879
Northampton,	C. L. Whitesell,	Nazareth,	1878
Bucks,	Eastburn Reeder,	New Hope,	1878
Adams,	E. G. Fahnestock,	Gettysburg,	1879
Susquehanna,	J. C. Morris,	Friendsville,	1880

OFFICIAL LIST.

PRESIDENT.

His Excellency John F. Hartranft.

VICE PRESIDENTS.

M. C. Beebe, Crawford,
Colonel James Young, Dauphin,
Professor J. P. Wickersham, Lancaster.

EXECUTIVE COMMITTEE.

His Excellency John F. Hartranft,
John P. Edge, Chester,
John L. George, Washington,
H. M. Engle, Lancaster,
A. Robinson, Mercer,
J. W. Shriner, Union,
Thaddeus Banks, Blair,
W. S. Roland, York,
W. A. Yeakle, Montgomery,
Thomas J. Edge, (ex-officio,) Chester.

ADVISORY COMMITTEE.

John P. Edge, Chester,
W. S. Roland, York,
H. M. Engle, Lancaster.

SECRETARY.

Thomas J. Edge.

EXTRACTS

FROM THE MINUTES OF THE MAY MEETING OF THE BOARD.

"WHEREAS, No plan has been adopted whereby the proceedings and papers of this board can be given to the public in advance of the publication of the regular report, as provided for by section seventh of the act forming the board; therefore, it is hereby

Resolved, That the president appoint a committee of three to confer with the proper officers of the Pennsylvania Agricultural Society, with reference to the publication of a portion of the proceedings and papers of this board, in the twelfth annual report of that society."

Adopted, and Messrs. Wickersham, Roland, and Smith appointed members of the committee.

At the ensuing session, this committee made the following report:

"The committee appointed to confer with the officers of the Pennsylvania Agricultural Society, in reference to the publication of the proceedings of your board, beg leave to respectfully report that they have had a conference with Mr. Seiler, (the secretary,) on the subject, with the following result:

First.—That the Pennsylvania Agricultural Society will not only be willing but glad to appropriate a reasonable space in its forthcoming report, one hundred pages, if necessary, to the publication of the proceedings and papers emanating from your board; and

Second.—That the officers of the society confidently expect to have their report ready for delivery in January next.

(Signed.)
J. P. WICKERSHAM,
W. S. ROLAND,
J. B. SMITH,
Committee.

REPORT.

[It having been demonstrated by the correspondence and inquiries which from time to time have reached the office of the board, that its history and objects are but imperfectly understood, and, in some cases, entirely misconstrued, it has been thought best, at the present early stage of its existence, to place upon record the following historical outline of its formation and organization.

The future work of the board must, in a great measure, depend upon events which from time to time present themselves, as well as upon the opinions and decisions of the board itself; hence any attempt on the part of its secretary to outline its future can only be accepted as the opinion of a single member of the board.]

HISTORICAL.

January 24, 1876, Doctor Edge, member of the House of Representatives from Chester county, introduced, and had read in place, a bill "To establish a State Board of Agriculture;" in regular course of business it was referred to the Committee on Agriculture, who, February 2, reported the bill with amendments, as follows:

An act to establish a State Board of Agriculture.

SECTION 1. *Be it enacted*, *etc.*, *etc.*, That the Governor of the Commonwealth, the Secretary of Internal Affairs, the Superintendent of Public Instruction, the Auditor General, the President of the Pennsylvania State College, and one person appointed from or by each agricultural society in the State, entitled under existing laws to receive an annual bounty from the county, and three other persons appointed by the Governor, with the consent of the Senate, shall constitute the State Board of Agriculture.

SECTION 2. One third of the members appointed shall retire from office on the fourth Wednesday in January in each year, according to their several appointments. The vacancies, thus occurring, shall be filled in the same manner as above provided, and the persons thus appointed shall hold their office for three years from the expiration of the former term. Other vacancies may be filled in the same manner, for the remainder of the vacant term.

SECTION 3. The board shall meet at the capital of the State, at least once in each year, and as much oftener as may be deemed expedient. No member of said board shall receive compensation from the State, except for necessary personal expenses, when engaged in duties of the board.

SECTION 4. They shall appoint, and prescribe the duties of a secretary of the board who may receive a salary, not exceeding fifteen hundred dollars a year.

SECTION 5. They shall investigate such subjects, relating to improvements in agriculture in the State, as they may find proper, and take, hold in trust, and exercise control over donations or bequests made to them for the promotion of agriculture and the general interest of husbandry.

SECTION 6. They may prescribe forms for, and regulate returns from, local agricultural societies, and furnish to the officers of each such blanks as they deem necessary to secure uniform and reliable statistics.

SECTION 7. They shall annually, on or before the 4th day of January in each year, by their president or secretary, submit to the General Assembly, a detailed report of their doings, with such recommendations and suggestions as the interests of agriculture may require.

SECTION 8. The secretary of the board shall, in each year, cause to be made and published, for distribution, as full an abstract of the returns from local societies, as the board may deem useful.

SECTION 9. The secretary shall have a permanent office at the capital, under the control and supervision of the board, which shall be supplied and maintained at the expense of the State.

This act shall take effect on the fourth Wednesday of January next ensuing.

This bill (House bill No. 189, 1876) passed finally April 26, by a vote of 119 to 22. It was reported from the Senate Committee on Agriculture, April 28, and finally passed, May 3, by a vote of 31 to 1, and was approved by the Governor, May 8, 1876. In accordance with the concluding section of the bill, the Governor notified the members elect to meet at the State capital, February 1, 1877, to transact such business as might be laid before them. At this meeting, twenty members answered to a call of counties, and the preceding organization was effected.

[For a full report of the proceedings of this meeting see proceedings of the Board.]

FINANCIAL.

February 8, 1877, Mr. Nisley, of Dauphin, introduced into the House, and had read in place, a bill "To provide for the current expenses of the

State Board of Agriculture," which, after the usual reference to the Committee on Agriculture, was reported to the House, as follows:

An act to provide for the current expenses of the State Board of Agriculture.

SECTION 1. *Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same*, That the following sums be, and they are hereby specifically appropriated for the expenses of the Pennsylvania State Board of Agriculture, for the year commencing on the fourth Wednesday of January, one thousand eight hundred and seventy-seven, to be paid out of any moneys in the treasury, not otherwise appropriated:

For the salary of the secretary of the board, fifteen hundred dollars.

For postage, telegrams, express charges, stationery, fuel, and for contingencies, five hundred dollars.

For actual traveling, or other necessary expenses of the members of the board, while engaged in attendance on the same, the sum of two thousand dollars, or so much thereof as may be necessary.

That there be published, in accordance with the provisions of the fifth, sixth, seventh, and eighth sections of the act establishing the same, eight thousand copies of their report, not to exceed in size five hundred pages each, containing abstracts of the transactions of the Pennsylvania Agricultural Society, of the Fruit Growers' Society of Pennsylvania, and of the Dairymen's Association of Pennsylvania, to be apportioned and distributed as follows:

Two thousand thereof for the Senate, four thousand for the House of Representatives, fourteen hundred for the State Board of Agriculture, three hundred for the State Agricultural Society of Pennsylvania, two hundred for the Fruit Growers' Society of Pennsylvania, and one hundred for the Dairymen's Association of Pennsylvania.

For collecting, transcribing, compiling, and furnishing the matter for said volume, the sum of one thousand dollars is hereby appropriated, said compilation to be under the direction of the executive committee of said State Board of Agriculture, who shall deliver said copy or matter to the Superintendent of Public Printing and Binding, and to be paid in the usual manner, upon presentation of the receipt of said Superintendent of Public Printing and Binding, that all copy or matter for said volume has been received by him.

This bill (House bill No. 269, 1877) was read the first time, February 21; second time, March 1, and, on motion, amended so as to make the appropriation for the expenses of the members one thousaud dollars, and striking out all after the section making this appropriation. The bill, as amended, was read a third time, and passed by a vote of 137 to 15; in due course of business, it was read a third time in the Senate, March 16, and passed by a vote of 30 to 4; it was approved by the Governor, March 21, 1877.

SUPPLEMENTAL BILL.

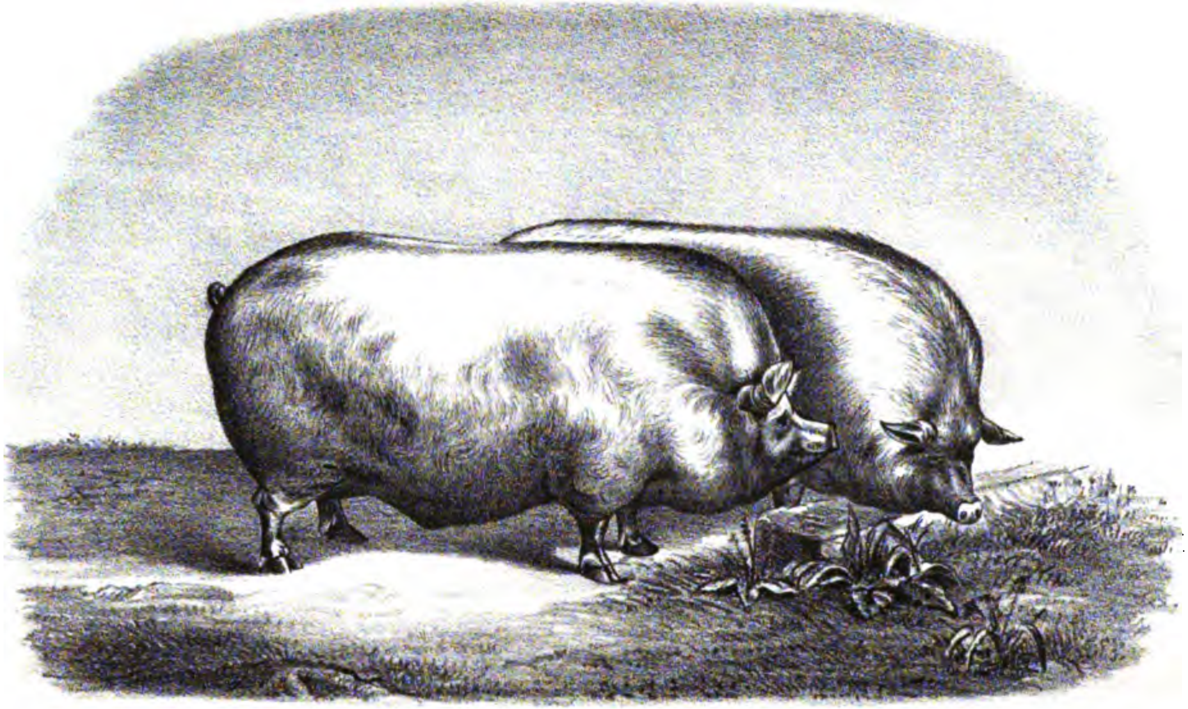
Mr. Port introduced into the House, and had read, a bill, entitled "A supplement to an act to establish a State Board of Agriculture. Approved May 8, 1876," which was reported from the committee, February 7, with amendments, as follows:

A supplement to an act, entitled "An act to establish a State Board of Agriculture," approved the eighth day of May, Anno Domini one thousand eight hundred and seventy-six.

SECTION 1. *Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same,* That in addition to the members of said board, as authorized in first section of the act, to which this is a supplement, it is herein provided that the Pennsylvania State Agricultural Society shall elect, by ballot, annually, on the third Wednesday in January, three members of said board from the executive committee of said society, to serve one year; the Fruit Growers' Society of Pennsylvania shall, in like manner, elect two members annually to serve one year, and the Dairymen's Association of Pennsylvania shall, in like manner, elect one member of said board, to serve one year, and the Wool Growers' Association of Pennsylvania, if any there be or shall be, shall in like manner elect annually one member of said board to serve one year, and the members so elected shall be members of the State Board of Agriculture.

SECTION 2. The said Board of Agriculture, in addition to their duties, as provided in said act, shall constitute a board of visitors of the Pennsylvania State College, and of the several experimental farms connected therewith. They shall hold one meeting each year at the college, and may hold one meeting each year at each of the experimental farms located in the counties of Chester and Indiana, respectively; they shall have full and free access to the records and accounts of the said institution, but shall in no way interfere with the management thereof, as committed to the board of trustees, or the instruction and internal discipline thereof as committed to the faculty, except in the way of recommendation or suggestion; they shall also have the the right to establish and maintain (at the said college, and in connection therewith) a museum and library.

SECTION 3. The secretary may, under the direction of the board, appoint one or more suitable agents to visit the several counties of the State, for the purpose of inquiring into the methods of husbandry in practice, ascertaining the adaptation of agricultural products to soil, climate, and



Improved

CHESTER WHITES.

markets; encouraging the establishment of farmers' clubs, libraries, and reading-rooms, and extending information, by means of lectures or otherwise; such agents shall make report to the secretary of the board in November following their appointment.

This bill, (House bill No. 202, 1877,) after first reading, was, with other unfinished business, left over until next session, to be taken up in regular order.

MEMBERSHIP.

The first section of the bill establishing the board, permits the election of members by county agricultural societies upon certain conditions, not duly set forth in the body of the bill; this fact has caused much correspondence and inquiry, and in some cases has been misunderstood. The bounty therein referred to, was granted by an act passed in 1851, entitled "An act incorporating the Pennsylvania Agricultural Society," approved March 28, 1851, (see laws of session of 1851, bill No. 203.)

The section of the bill having special reference to the matter under consideration, is as follows: "When any number of individuals shall organize into an agricultural or horticultural society, or any agricultural or horticultural society now organized in any county, in this Commonwealth, shall have adopted a constitution and by-laws for their government, elected officers, and raised annually, by voluntary contribution of its members, any sum of money which shall have been actually paid into its treasury, for the purpose of being disbursed for the promotion of agricultural knowledge and improvement, and that fact be attested by the affidavit of its president and treasurer, the said county society shall be entitled to receive annually a like sum from the treasury of the county: *Provided*, That said annual payment from the county funds shall not exceed one hundred dollars: *And provided*, That but one such society in any one county, shall be entitled to receive such appropriations in any one year under this act."

On comparing this section with section first of the bill establishing the board, it will be noticed that, in order to secure a membership in the board, it is not absolutely essential that the society should actually have *received* a bounty from the county treasury, but that the fact that it is entitled to such bounty being established, the right to membership naturally follows.

THE DUTIES OF THE BOARD.

As has perhaps been already noted by the reader, the act forming the board defines its duties only in a general way, and it is evident that it was the intention of the Legislature that it should, within certain limits, arrange and prescribe its own duties. Such being the case, it is evident that these duties will be more or less governed and directed by the contingencies which from time to time arise. The duties of the secretary of the board include a large and varied correspondence with the leading agriculturists of this and other States, and with those noted for their interest in agriculture and agricultural improvement; the general drift of this correspondence will indicate the course of public opinion, as well as public needs, and the report of the secretary to the general meeting of the board may be regarded as the reflex of this opinion; from this they may direct their work, and with their own knowledge of the needs of farmers, will, within certain limits fixed by the law, form their guide.

Sections fifth, sixth, and seventh would lead us to infer that so far as being governed by the law forming the board is concerned, its work is to be directed to the investigation of "such subjects relating to improvement in agriculture in the State as they may find proper." This gives a wide range, and the work contemplated is not only important but almost endless.

It is a well known and generally admitted fact, that our county agricultural societies are not conferring that benefit on the farmer which he is entitled to expect, and that financially they are far from being in a healthy condition. These societies, or at least such of them as receive a bounty from the county, and are represented in this board, are, to a certain extent, specially interested in the proceedings of the board, which should find it within the scope of its duty to arrange some plan by which they may be made a success, not only financially but practically.

Section seven evidently contemplates, as one of the duties of the board, the recommendation (suggestion) of such legislation as the interests of agriculture may require. As the following report will prove, the board have accomplished considerable work in all three of the branches of duty contemplated by these three sections of the law. The important question of fertilizers, and the influence of forest upon rain-fall, have already received the consideration of the board, and, as is shown by further reports, a decision has been reached in both cases. Blank forms have been prepared and distributed to county agricultural societies, and, when filled up and returned, will form an exhibit of the condition of these bodies, which will enable the board to act with judgment and benefit. Two proposed laws have been prepared and submitted to the agricultural organizations of the State for amendment, and after alterations—the need of which has been first proven—have been made, will be submitted to the Legislature for its action. The board has a corps of some two hundred reporters, regularly and systematically distributed over the State, and to them blank forms will be sent. These, when properly filled up and returned, will form a basis for tables, which must prove of value to the agricultural interests of the State.

In summarizing the duties of the board we may assume—

That it should supplement and assist all other organizations having for their object the improvement of agriculture, or its kindred interests, and that it should be antagonistic to none; that it should specially assist not only such county organizations as are represented in its organization, but also all others in the State; that it should have an oversight of the artificial manures used in the State, and that to secure this it should have power to collect, and have analyzed by a competent chemist, samples of such manures, and that it should have power to publish the result of such analysis, at such times as will most benefit farmers, and best guide them in their purchases; that it should collect the general agricultural statistics of the State, and have power to report the condition of the crops at such times as may be most useful. In fact, that the board should form a head around which the agricultural information of the State may be collected and preserved in such a form as may be most available to those interested. For the want of just such a body, and such a mode of collecting, much of interest and value to the agricultural interest of the State is lost.

As a means of collecting statistics, the corps of correspondents, (before alluded to,) appointed by Senators and members of the House of Representatives, and thus placed at regular intervals over the State, will prove not only efficient, but invaluable. Among other duties, these reporters will at once report to the secretary of the board any contagious or infectious disease among stock, and the case will at once be laid before the veterinary surgeon of the board for such action as may be needed. As our State, in common with others, is liable at any time to an outbreak of disease now prevailing among European stock, this system of reports will give the first alarm, and if a remedy is to be applied, it may be tested at once, and practical advice given as to the best mode of procedure in each disease.

PROCEEDINGS

OF THE

PENNSYLVANIA STATE BOARD OF AGRICULTURE.

CONDENSED FROM THE MINUTES.

In accordance with the call of the Governor, the members elect of the State Board of Agriculture met in the library-room of the State capitol, February 1, 1877, at 2, P. M.

His Excellency the Governor was called to the chair, and Wm. H. Holstein appointed temporary secretary. On a call of counties, in alphabetical order, fifteen delegates responded.

On motion, the chair appointed a committee on credentials, consisting of W. G. Moore, Prof. J. P. Wickersham, and Thaddeus Banks.

The committee on credentials reported as follows: "That the members of the board consist of his Excellency Governor John F. Hartranft; Gen. W. McCandless, Secretary of Internal Affairs; Prof. J. P. Wickersham, Superintendent of Public Instruction; J. F. Temple, Auditor General; Rev. James Calder, President Pennsylvania State College."

The members appointed by the Governor are: Hon. John P. Edge, of Chester; Col. James Young, of Dauphin, and John L. George, of Washington.

Members from the following county societies are present, with credentials and certificates of bounty: Berks, W. G. Moore; Blair, Thaddeus Banks; Lancaster, H. M. Engle; York, W. S. Roland.

The following members of county societies with credentials, but no certificates of bounty paid, are present:

Centre, Professor J. Hamilton; Chester, Thos. J. Edge; Indiana, G. W. Hood; Mercer, A. Robinson; Montgomery, W. H. Holstein and W. A. Yeakle; Northumberland, J. A. McFarland; Schuylkill, J. S. Keller; Union, Jos. W. Shriner; Crawford, M. C. Beebe.

The committee would recommend that the last named ten persons be allowed seats upon the floor during this meeting, and in the meantime, those delegates from societies entitled to an annual bounty, not having certificates of the same, be requested to obtain such certificates, so that there may be no question of their right to membership in the future meetings of the board.

(Signed.) W. G. MOORE,
Chairman.

Report adopted, and committee discharged.

On motion of Mr. Yeakle, of Montgomery, a committee of seven on organization and business, consisting of Messrs. Edge, Beebe, Africa, Roland, Calder, George, and Hamilton, was appointed by the chair.

At a subsequent session of the board, the committee on organization and business made the following report, which was accepted:

I. That his Excellency, the Governor of the Commonwealth, shall be president of the board.

II. That three vice presidents shall be elected, and shall be chosen as follows: One from the ex officio members of the board, one from the members appointed by the Governor, and one from the members appointed from the county societies.

III. There shall be an executive committee to consist of nine, three of whom shall be the Governor and two of his appointees, which two, with the other six members of the committee, shall be chosen by the board. Three members shall constitute a quorum for the transaction of business. All bills incurred under the act creating the board shall be submitted to this committee for approval. (By a subsequent resolution, the secretary of the board was made *ex officio* a member of the executive committee.)

IV. The secretary shall have a practical knowledge of agriculture. It shall be his duty—To keep the minutes of the meetings of the board; to act as librarian and curator, and shall have charge of all books and papers belonging to the board; shall attend the room of the board unless relieved by the board or its executive committee; to open and invite a correspondence with agricultural associations and agriculturists of the State, on the following topics:

1. The dignity, usefulness, and profit of farming, and the relation it bears to other interests in the State.
2. The different kinds of soil in the State, and their adaptation to agricultural purposes.
3. The various kind of manures and their effects.
4. Draining and its benefits.
5. Preparing the ground for crops.
6. Rotation of crops.
7. Selection of seeds, and quantities to be sown.
8. The time and manner of planting, and treatment of growing crops.
9. Housing and harvesting the various crops.

10. The breeding and care of live stock.
11. The fattening of animals.
12. Care of cows, milk, butter, and cheese.
13. Curing meat, preserving fruit, vegetables, and roots.
14. Keeping poultry and bees.
15. Gardening in all its branches.
16. Location and style of farm buildings.
17. Building and repairing fences and roads.

And to forward by mail to the address of each member, a notice of the time of each meeting of the board, at least ten days before the time of said meeting, and to perform such other duties as may from time to time be prescribed by the board or its executive committee.

V. There shall be chosen a botanist, chemist, pomologist, mineralogist, entomologist, veterinary surgeon, and microscopist, who shall be honorary members of the board, and shall serve without compensation.

VI. That all the officers of the board, except the president, shall be elected annually, on the fourth Wednesday in January.

VII. Twelve members of the board shall constitute a quorum for the transaction of business.

VIII. Special meetings of the board may be called by direction of the executive committee.

An election for officers was then held, resulting in an organization as given on a preceding page.

MAY MEETING.

Board met at 2, P. M., Tuesday, May 22, 1877. His Excellency the Governor in the chair. All members present. The committee on credentials reported that Messrs. Barnes, of Lehigh; Culver, of Bradford; Wilson, of Juniata; Morris, of Susquehanna; Reeder, of Bucks; Whitesell, of Northampton, and Foresman, of Lycoming, were present and properly accredited from their respective societies; they were confirmed as members of the board. At a subsequent session, Messrs. Wilson, of Tioga, and Fahnestock, of Adams, appeared with similar credentials, and were confirmed as members.

The executive committee reported that, in accordance with the instructions of a previous meeting, they had made the following nominations as honorary officers:

For Professor of Vegetable Physiology, and Botanist—Thomas Meehan, of Philadelphia.

For Professor of Horticulture, Science, and Pomologist—Josiah Hoopes, of West Chester.

For Chemist and Mineralogist—Doctor F. A. Genth, University of Pennsylvania.

For Entomologist—Professor W. A. Buckhout, State College.

For Veterinary Surgeon—C. B. Michener, Bucks county.

For Microscopist—Doctor Henry Leffmann, Philadelphia.

On motion of M. C. Beebe, Professor J. P. Lesley was nominated as Geologist.

Each nomination was separately considered and confirmed by acclamation.

The board then proceeded to carry out the following programme, which had been previously adopted:

Reading report of the secretary of the board; report of chemist; to be succeeded by the following:

Essay—	Fertilizer Laws, by	E. L. Sturtevant.
Do.	Valuation of Fertilizers, by	Secretary.
Do.	Fertilizers on the Eastern Experimental Farm, by	John I. Carter, Supt.
Do.	On the Choice of Fertilizers, by	Secretary.
Do.	The Future of Our Board of Agriculture, by	Hon. John P. Edge.
Address—	Influence of Forest on Rain-fall, by	Thomas Meehan.
Essay—	Tree Planting for Shade, Shelter, and Profit, by	Professor S. B. Heiges.
Do.	Forest Area of the State, by	Secretary.
Do.	Pleura Pneumonia, by	Charles B. Michener, V. S.

Report of the Secretary of the Board.

In making this, my first report to the board, I am free to acknowledge that I do it with no small degree of doubt as to your opinion of my course since our last meeting. The minutes of the general meeting, and, also, those of the executive committee, it is true, mark out a general course of action, but the margin left for the exercise of my own judgment has been so wide as to render the choice of the proper course difficult.

The first subject which seemed to claim the attention of the board was the perfection of its organization, and a satisfactory decision as to the status of each agricultural society in the State.

An extended correspondence with members of the Legislature, the commissioners of the several counties, the secretaries of county agricultural societies, and with prominent farmers in the State, has furnished the data from which I have been able to compile a list of these societies with the following general result: I find that the commissioners of thirty-three counties are paying annual bounties to county organizations within their limits; that in nineteen counties there are active agricultural societies, which receive no bounty from the county; and in fourteen counties I fail to find any society; if any such does exist, it does not receive the annual bounty necessary to secure a representation in the board. In the thirty-three counties in which bounty is paid, there are fifty-one societies in good working order; and in the nineteen counties paying no bounty, there are twenty-six societies in active condition, making seventy-seven societies in the State; I have also on the list some five or six societies which from various causes have suffered their organization to fall.

If this data is correct, it would seem that the board would not exceed a membership of forty-one, of which thirty-three will be representatives of county societies.

The correspondence resulting from the attempt to obtain this information, has developed the fact that the law under which these bounties are paid, is but very imperfectly understood, and in some cases misconstrued. As several years have elapsed since its passage, I will ask your indulgence while I give the particular section which refers to the matter on hand, (see proceeding quotation from act No. 203, of session of 1851.)

Such being the law, I think we are warranted in assuming that it is not absolutely necessary that a society should hold an annual fair in order to secure the benefit of this act; that it is not even absolutely necessary that they should expend one hundred dollars before claiming a bounty from the county, but that, in the words of the law, the expenditure of any sum of money, as provided, will entitle them to receive an equal sum from the county treasury. In some few cases the commissioners have refused to pay the bounty; but so far as I can learn, all such cases are in process of settlement.

A majority of the societies receive a bounty of one hundred dollars. Lancaster receives thirty-two, and Schuylkill three hundred dollars.

* * * * * * * * * * * * *

The executive committee having transferred the duty of nominating suitable parties to fill the stations of honorary officers of your board to me, I have presented such names as I am satisfied will receive your sanction. These honorary members are expected to act as an advisory committee, upon whom the secretary can call for advice in the particular branches in which they are noted authorities. In making out the list of names which have been offered for, and have received your approval, I have been guided by what I believe to be the best interests, not only of the board, but also of the farmers of the State, and I feel satisfied that the reports of these gentlemen will form no unimportant portion of your proceedings and annual report.

* * * * * * * * * * * * *

After a careful survey of the subjects embraced in your instructions, and an adaptation of them to what I know to be the wishes of the farmers of the State, I have selected the question of the manufacture and sale of commercial fertilizers as one of the most important, or at least as the one first needing our attention. For several years past, I have been satisfied that a careful and disinterested analysis of the fertilizers in use in the State would be of great benefit to the consumer, as well as to the honest manufacturer; hence, the course which I have pursued is but the carrying out of an old idea.

In completing this plan, I have been ably and practically assisted by Dr. F. A. Genth, the chemist of the board; with his assistance I have had collected and analyzed many of the leading commercial fertilizers in the State. In most cases the samples were selected by myself, or under my supervision, from the ordinary stock of the manufacturer. In a few cases, at a distance, I have had samples selected by agents, in whom I have perfect confidence. By special request of your chemist, he was not furnished with the name of the manufacturer or manure until after a full analysis had been returned to this office. From the manner in which the samples were selected, and in which the analyses were conducted, we think it is but just to take the result as indicative of the condition of the special brand at the time it was selected.

* * * * * * * * * * * * *

Soon after our last meeting, my attention was directed, by several correspondents, to the extensive advertisements of "Prepared Seeds," at a price much above that of an ordinary article, and several samples were sent to the office, with a request for information as to whether there was anything of value in the preparation which would warrant the increased price. A sample procured direct from the advertiser was submitted to a microscopic and chemical test, with a result as set forth in the report of the proper officers, and to a practical test on the Eastern Experimental Farm, with a result as set forth elsewhere by the report of its superintendent. I would explain this action by claiming it to be the duty of this board to guard the interests of the farmer in every possible way, and that any such examination is clearly within our line of duty.

* * * * * * * * * * * * *

The correspondence of the past five years with the farmers of the State, and particularly with those of the eastern portion, has convinced me that a strong desire exists among them for some kind of legislation which shall insure a fair return for the money expended in commercial fertilizers. In one or two cases, this desire has resulted in obtaining special or local legislation, which seems to have failed in its results because it was local. There was a strong disposition to press this matter upon the attention of the last Legislature, but in deference to the organization of this board, the subject was held in abeyance. In asking for such a law, our farmers are asking for nothing new, for similar laws are in force in nearly all the States which are large consumers of this kind of material. The result of such legislation, and the arguments in its favor, will be more fully set forth in an essay by Mr. Sturtevant, who has given the matter his attention.

* * * * * * * * * * * * *

After an examination of the fertilizer laws of other States, and a consultation with our own chemist, as well as with others able to give advice, I have prepared the following law, which is submitted to your consideration, and that of the farmers of the State. For this no claim of perfection is made, and no doubt it will be amended before it is laid before the Legislature, in case you indorse it:

An act to regulate the manufacture and sale of fertilizers.

SECTION 1. *Be it enacted, &c.*; That every package of commercial fertilizer sold, offered, or exposed for sale within this Commonwealth, shall be accompanied by an analysis, stating the percentage therein contained of nitrogen, or its equivalent in ammonia; of potash, in any form, soluble in distilled water; of phosphoric acid soluble in a neutral solution of citrate of ammonia, at a temperate of 100° Fahrenheit, and the percentage of phosphoric acid not thus soluble: *Provided*, That no analysis shall be required for packages of fertilizers which are sold, offered or exposed for sale at a less price than twenty dollars per ton.

SECTION 2. Every manufacturer or importer of commercial fertilizers, as specified in section one, before offering the same for sale in this Commonwealth, shall take out a license as a manufacturer or importer, and pay into the Treasury of the Commonwealth, the sum of . . . . dollars, annually, as a license fee for each kind of fertilizer sold or imported by him, and shall, at the same time, file with the secretary of the State Board of Agriculture, a paper, giving the names of his principal agents, and also the name and composition of the fertilizer manufactured or imported by him.

SECTION 3. Any person selling, offering, or exposing for sale, any commercial fertilizer, without the analysis required by section one, or with an analysis stating that said fertilizer contains a larger percentage of any one or more of the constituents mentioned above, than is contained therein, or for the sale of which all the provisions of section two have not been complied with, shall forfeit fifty dollars for the first offense, and one hundred dollars for each subsequent offense.

SECTION 4. It shall be the duty of the chemist of the State Board of Agriculture, to analyze such specimens of fertilizers as may be furnished by the board or its agent, and he shall report to the State Board of Agriculture the results of the analysis made by him, and shall furnish the secretary of the board with such important information relative to fertilizers as he may from time to time obtain.

SECTION 5. The fee of the chemist of the State Board of Agriculture for such analysis shall not exceed the usual and regular price for such services, and shall be payable from the Treasury of the Commonwealth, on the certificate of the secretary of the Board of Agriculture: *Provided*, That the total sum paid in any one year, for such service, shall not exceed the amount paid into the treasury, as license fees, during the same period. This act shall take effect from and after its passage.

Having decided upon the propriety of such an act, the next question for your consideration will be as to who shall bear the expense of the analysis. By the plan proposed in the act, it will be first paid by the manufacturer, but in the end will come from the consumer. It has been claimed that up to a certain limited amount, the cost should be borne by the State. On the other hand, it may be claimed that such a law gives the honest manufacturer a protection, by driving from the market the inferior and dishonest brands, and that this protection more than balances the cost to him. The correspondence which has been called out by the proposed law, develops the fact that many hold the idea that there is, and necessarily must be, a species of antagonism between the consumer and manufacturer of this class of manures. This, we think, is wrong, and should be discouraged by your board. There should be no more antagonism between these two classes than there is between the farmer and the consumer of his grain or other produce. Any law which may be proposed should insure equal and exact justice to both parties, or it will fail in its object. For the result of the analysis of the samples collected and forwarded from this office, I would refer you to the report of the chemist, and to a tabulated statement elsewhere.

* * * * * * * *

The correspondence which has reached the office of the board during the past four months, has developed the fact that there is a desire on the part of a limited number in our State, for the passage of an act encouraging the planting and growth of timber, as well as for the better protection of that already growing. The claims which are urged in favor of such legislation, turn mainly upon four points, viz: Shade, shelter, profit, and influence in rain-fall. The first two seem to mainly relate to planting along the public roads; the third is more of a private than public nature; while the last is urged upon the broad ground of State and national welfare. Of the value of these different claims, you will perhaps be better able to judge after they have been presented to you by those more competent to present them than myself. The influence of forest upon rain-fall, you will conclude after you have heard the evidence, is an unsettled question, which, if seriously controverted, destroys the strongest argument in favor of such legislation; the question of profit needs only a plain demonstration to commend it to the land owner, while the question of shade and shelter along the public roads is of general interest, and upon which much may be said upon both sides.

* * * * * * * *

The usefulness and value of the board to the farmers of the State, depends upon having them interested in its work, and in its meetings. My correspondence with parties in other States, who are interested in such meetings, and with farmers in our own State, shows plainly that we can scarcely expect to draw them from all portions of the State to a central location to attend our meetings. In other States it has been found best to hold public meetings of the board in different portions of the State, so that all regions and all interests may be reached. If this argument is good when applied to such States as Massachusetts, Connecticut, and Vermont, it may be applied with even more force to a large State like our own. The success which has attended the plan, is a strong indication of the result in our own State. In view of this, and other arguments which might be offered, I would suggest, for your consideration, the following plan: That the annual meeting of the board be held here, but that the executive committee have power to call meetings in different portions of the State, as they may deem best; that these meetings be devoted to the consideration of questions which are applicable to the section in which they are held; that they should not be considered as general meetings of the board, but that the executive committee have power to call to the assistance of the secretary such members of the board as are convenient to the place of meeting, or are specially qualified to discuss the questions under consideration. This plan presents the following advantages, in addition to those already named, which will, no doubt, receive from you the consideration to which they are entitled. It will enable the secretary (should you continue to place the duty on him) to select subjects, which will interest and apply to the section in which the meeting is held. It will enable us to hold a larger number of meetings without any increased expense, and will give us the power of reaching a greater number of farmers. The size of our State and the diversity of interest among our farmers, is a powerful argument in favor of this or some similar plan.

You will readily see that this will very much diminish my labor, for I feel that it is not the best use of the means placed at our disposal to discuss questions involving the dairy interest here, to take up the question of cattle feeding in Delaware or Montgomery counties, or present the leading features of the fertilizer question in the western part of the State.

Each of these districts has its own special interest, and to that interest its farmers very naturally direct their attention.

* * * * * * * *

Fully believing that the work which we have already accomplished, in the examination and analysis of commercial fertilizers, has been productive of good fully commensurate with the expense incurred, and will, in the future, yield the best return for the amount expended, I would ask your permission to continue the examination, with power to make report when the matter collected will warrant it.

* * * * * * * *

In conclusion I would report that, in addition to the correspondence necessarily incident to the subjects already alluded to, I have kept up a constant correspondence with the National Department of Agriculture, and with the State Boards of other States. It has also been my duty to answer numerous letters of inquiry from farmers in all portions of our State, and other States, and I am fully satisfied that the correspondence has resulted in good, not only to the parties writing, but also to your board, and that, in the future, this will prove no small portion of the duties of your secretary, and at the same time one of the many ways in which the board may be useful to the farmers of the State.

On motion of Mr. Barnes, the report of the secretary was referred to a committee of three, to be named by the president.

At a subsequent session of the board, this committee made the following report:

First.—The committee to whom was referred the report of the secretary of the board, ask leave to submit the following: That they have read with great interest the report made by the secretary, and regret that, on account of the inadequate appropriation, it cannot be printed and given to the public in a more expeditious manner than seems to be open for said purpose, as it has been prepared with great care, and has imposed much labor on the secretary.

Second.—In regard to the local meetings recommended by the secretary, to be held in different parts of the State, your committee believe that the organic law requires all meetings to be held at the State capital.

Third.—The analysis of fertilizers, referred to in the secretary's report, is commended by this committee, and its continuance, under the conditions asked for by him, is very much desired.

(Signed,) J. P. BARNES,
D. WILSON,
E. G. FAHNESTOCK.
Committee.

After a full and free discussion of the merits of each section of the report, the first was adopted, the second laid on the table, and the third adopted, and the committee discharged.

On motion of M. C. Beebe, the secretary was instructed to obtain the opinion of the Attorney General, as to the power of the board to hold meetings at other places than the State capital, and in the event of a negative decision, the executive committee be instructed to prepare a law remedying this defect, and present the same for the action of the next Legislature.

REPORT

OF

Dr. F. A. GENTH,

Chemist, Pennsylvania State Board of Agriculture.

UNIVERSITY OF PENNSYLVANIA,
WEST PHILADELPHIA, *May 16, 1877.*

Secretary Pennsylvania State Board of Agriculture, Harrisburg, Pa.:

DEAR SIR: I beg to submit my report on fertilizers, with especial reference to those used in this Commonwealth.

The time for its preparation was too short to make it complete, but I trust that, incomplete as it is, it contains a good deal of information which may be of value to our farmers.

In compliance with your request, I have added to the analyses of the fertilizers a valuation which shows their comparative merit, although I am not altogether satisfied with the entire correctness of the data upon which this is based; it will give an approximation at least.

It is a known fact that superphosphate of lime, when mixed with a portion of undecomposed bone, phosphate of lime or oxides of iron, and alumina, gradually loses its solubility in water, and goes back to an insoluble form. *Such* phosphoric acid is known in commerce as "gone back," "reverted," "reduced," or "precipitated" phosphoric acid.

A very similar result is obtained when a perfectly soluble superphosphate of lime is put in the soil. Its phosphoric acid almost immediately becomes insoluble in water, exactly as the reverted phosphoric acid in a fertilizer.

Such precipitated phosphoric acid, however, is not lost to the crops; it is almost as readily assimilated by the plants as the soluble, and for this reason there is hardly any difference in their value.

A far greater difference exists in that of the insoluble phosphoric acid, depending upon the nature of the raw materials which contain it, some being more readily acted upon and the phosphoric acid converted into an available form than others. Phosphoric acid in bones and some varieties of pulverulent guanos, for instance, is certainly worth much more than that of apatite, rock guanos, and the phosphatic nodules of South Carolina. No distinction between them has been made in the valuation of the fertilizers, as this would not be of much practical value.

I may here remark, that all superphosphate manures, in which the value of the insoluble phosphoric acid forms a considerable item, have not been prepared with that care which is necessary to furnish a first-class article.

Very few of the artificial fertilizers contain "actual" ammonia; the nitrogenous matter used, is mostly in the form of dried blood, dried meat, dried fish, &c., &c., and the valuation given is believed to be a fair one.

For the nitrogen in the form of hair, horn, hoof, &c., I have given no valuation, because these substances are so difficult to decompose, that from their nitrogen very little benefit can be derived.

The valuation of the potash in manures is difficult under present circumstances, on account of the great rise in the prices of the purer salts, caused by the war in Europe; in the form of Kainite it still can be obtained at a reasonable figure.

The following are the rates which have been adopted in this report for the valuation of fertilizers:

For soluble and reverted phosphoric acid,	10	cents per pound.
For insoluble phophoric acid,	4	cents per pound.
For soluble silicic acid (diatoms,)	5	cents per pound.
For potash,	7	cents per pound.
For ammonia,	17½	cents per pound.
For alkaline sulphates,	1	cent per pound.

I believe that they will give a fair representation of the comparative value of our artificial fertilizers.

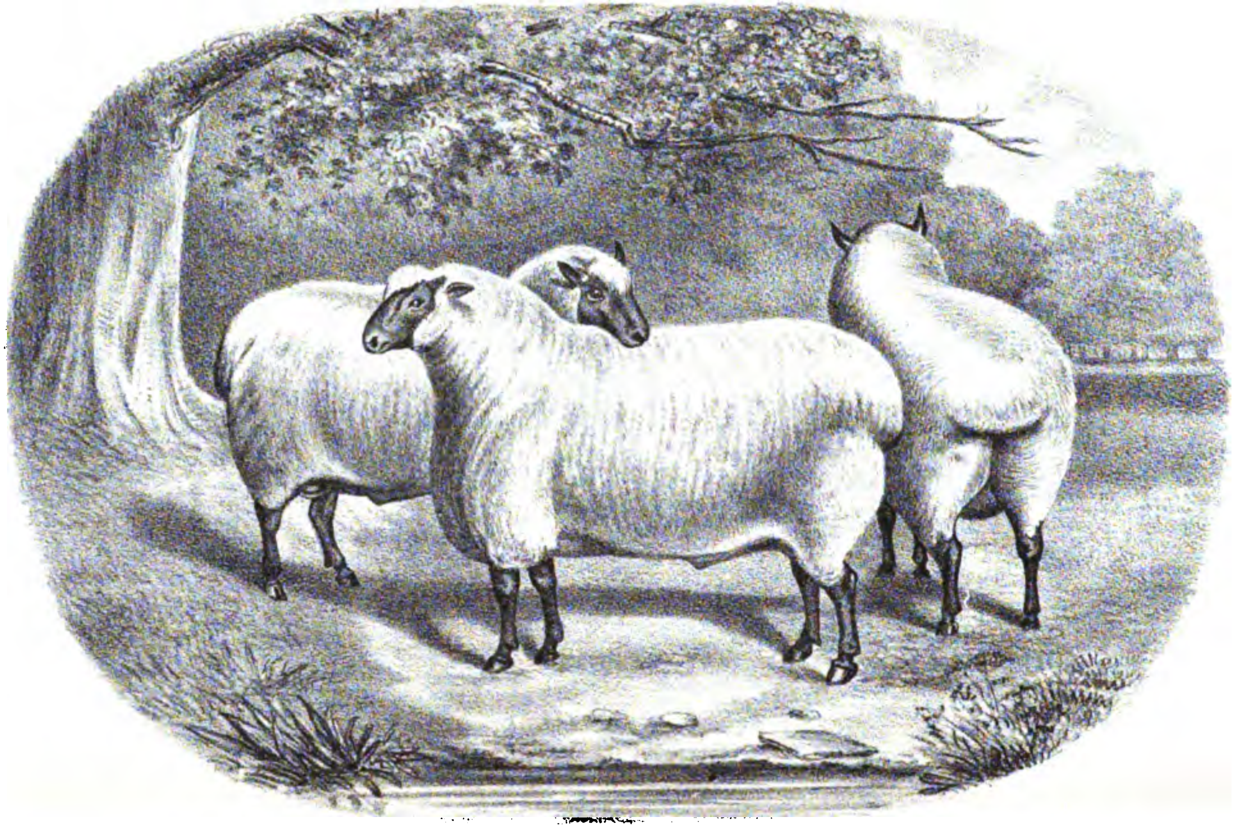
Yours, very truly,

F. A. GENTH.

The introduction of artificial fertilizers, not many years over a quarter of a century ago, may be considered the beginning of a new era in agriculture.

Their application enabled the farmers, after the exhaustion of their soils by successive abundant crops, and consequently the removal of vast quantities of plant food, in the form of phosphoric acid and potash, to restore their lands again to fertility, by returning these substances in sufficient amounts to insure full crops.

As it is with every industry, so it was in the manufacture of artificial fertilizers. For the want of experience, many errors were at first committed, and manures were placed on the market which frequently failed to produce the desired result.



OXFORDSHIRE DOWNS

UNIV. OF

This was to a great extent owing to the fact that many fertilizers contained only *one* of the essential constituents, generally only phosphates, and the phosphoric acid* often *not* in a form in which it is readily taken up by the plants, whilst potash and nitrogenous compounds were more or less neglected.

This error was soon discovered, and at present no fertilizer can be considered perfect, unless it contains available phosphoric acid, as well as potash and nitrogen compounds, from which the nitrogen can be readily assimilated by the plants, all in such proportions that, by their application, the two former substances, which have been removed from the soil, are fully restored.

In the following I intend to give the analyses, which I have made of the most important raw materials, at present used in the manufacture of artificial manures, also, analyses of the principal fertilizers, as they are supplied to the farmers of this State.

I. PHOSPHATIC RAW MATERIALS.

1. *Bone-ash from Buenos Ayres.*

I have made an analysis of a sample from a cargo imported into Baltimore, which I found to contain:

Moisture, ... = 1.54
Organic matter, ... = 1.26
Carbonic acid, ... = 1.13
Sulphuric do. . . . . = 0.28
Phosphoric do. . . . . = 36.48
Lime, ... = 45.64
Magnesia, ... = 1.15
Sand, ... = 9.56
Fluorine, oxide of iron, Chloride of sodium, &c., } not determined, ... = 2.96

100.00

36.48 per cent. of phosphoric acid are equivalent to 79.64 of bone phosphate of lime.

One ton of 2,000 pounds contains 729.6 pounds of phosphoric acid, worth $29 18.

Other samples of "bone-ash" from Buenos Ayres contained:

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* As this report is intended principally for the use of farmers, I do not think any one will find fault with me in using the old and familiar chemical nomenclature instead of the more exact modern, as for instance phosphoric acid instead of phosphorus pentoxide or phosphoric anhydride, or potash instead of potassium oxide, &c.

28.14 per cent. of phosphoric acid, equal to 61.43 per cent. of bone phosphate.
36.20 " " 79.05 " "
38.67 " " 84.42 " "

2. *Prairie Bone.*

A sample of "fine ground Prairie Bone," obtained in this city, had the following composition:

Moisture,	= 7.30
Nitrogenous organic matter,	= 30.27
Bone phosphate of lime,	= 29.11
Carbonate of lime,	= 3.71
Ferric oxide,	= 0.76
Silicic acid,	= 2.00
Alkaline salts,	= 26.28
Magnesia, &c., not determined,	= 0.57
	100.00

The organic matter contained 2.61 nitrogen, equivalent to 3.17 ammonia; the alkaline salts contained 0.36 potash, and the bone phosphate of lime 13.34 phosphoric acid; the value of a ton of this fertilizer whould therefore be:

63.4 pounds of ammonia,	$11 10
7.2 pounds of potash,	50
266.8 pounds of phosphoric acid,	10 67
	$22 27

3. *Bone-Dust.*

I have analysed several samples of "bone-dust," as it is found in this market, with the following results:

	1.	2.
Phosphoric acid,	=15.22	12.60
Equal to bone phosphate of lime,	=33.23	27.51
Nitrogen,	= 2.29	1.89
Equivalent to ammonia,	= 2.78	2.29

The value of a ton of 2,000 pounds would be:

1. 304.4 pounds of phosphoric acid,	=$12 18
55.6 pounds of ammonia,	= 9 75
	$21 93
2. 252 pounds of phosphoric acid,	=$10 08
45.8 pounds of ammonia,	= 8 02
	$18 10

Bone-dust of Lister Bros., Newark, New Jersey, sold in this city, contained:

Moisture,	10.90
Phosphoric acid,	10.93
Equivalent to bone phosphate of lime,	23.86
Nitrogen,	2.99
Equivalent to ammonia,	3.63
Sulphate of lime,	3.38
Sulphate of soda,	13.75
Sulphate of potash,	Trace.

The value of a ton of 2,000 pounds is:

218.6 pounds of phosphoric acid,	$8 74
72.6 pounds of ammonia,	12 71
	$21 45

4. *Bone-Black.*

I have analyzed several samples of sugar-house bone-black, and give for comparison the composition of a sample of fine black from a cargo imported from England:

Moisture,	5.22
Sulphuric acid,	0.10
Sulphur,	0.11
Phosphoric acid,	35.40
Carbonic acid,	2.88
Ferric oxide,	0.16
Magnesia,	0.93
Lime,	43.85
Alkaline salts,	0.80
Sand,	0.48
Carbon,	9.84
Organic matter,	0.23
	100.00

Other samples contained: 37.87, 35.24, 34.92, 33.90, 32.73, 35.79, and 35.44 per cent. of phosphoric acid, giving an average of 35.25 per cent; or, 705 pounds per ton, in value equal to $28.20.

For comparison, I give the results of analyses, which I have made, of "pure ground steamed bones," and "ground roasted bones," manufactured by the Bradley Fertilizer Company, of Boston, Massachusetts.

5. Pure Ground Steamed Bones.

Phosphoric acid,	=22.82
Equivalent to bone phosphate of lime,	=49.82
Nitrogen,	= 3.43
Equivolent to ammonia,	= 4.16

Their value per ton is:

456.4 pounds of phosphoric acid,	=$18 26
83.2 pounds of ammonia,	= 14 56
	$32 82

6. Ground Roasted Bones.

Phosphoric acid,	=24.87
Equivalent to bone ph. of lime,	=54.29
Nitrogen,	= 3.41
Equivalent to ammonia,	= 4.14

A ton contains, therefore:

497.4 pounds of phosphoric acid, worth,	$19 90
82.8 pounds of ammonia, worth,	14 49
	$34 39

Bones, in their various forms, are, undoubtedly, the best material for the manufacture of artificial manures, but, unfortunately, the supply is too limited for the enormous production of the latter; therefore, immediately after the so-called superphosphate of lime-fertilizers were introduced, the whole world was searched over, and many localities were discovered, from which an abundant supply of phosphates could be obtained.

One of the richest is the natural phosphate of lime.

7. Apatite.

It is a combination of fluoride, or chloride of calcium, with phosphate of lime, containing, in its pure state, about 42 per cent. of phosphoric acid.

Small quantities of apatite have been observed in the gneissic rocks and some of the limestone beds of Chester, Delaware, and Philadelphia counties; large beds of it have been discovered in similar rocks in Canada, one of fifteen feet in thickness, containing, on an average, about 85 per cent. of bone phosphate of lime.

It is to be hoped that when the geological survey of the south-eastern counties of Pennsylvania is undertaken, similar deposits may be found.

Large bodies of a fibrous variety of apatite, so-called "phosphorite," yielding from 50 to 85 per cent. of bone phosphate of lime occur in Spain. They might be brought to this country as ballast, for a price which would enable manufacturers to make use of this important raw material for the manufacture of superphosphates.

Many islands in the Pacific and Atlantic oceans, which are inhabited by innumerable sea birds, which there live, and die, and decay, together with the food on which they lived, furnish very valuable manures, some ready for immediate application, others which serve as a raw material for artificial fertilizers.

It is evident that at localities where the decomposition of this large quantity of animal matter is going on, without interruption, in a rainless country and under a hot sun, the quality of the guano thus formed must be of an entirely different character from that which is produced, where frequent rains, or the sea water, have washed out everything that was soluble.

In the first mentioned places guanoes, rich in nitrogenous compounds, ammoniacal and potash salts are formed. To this class belong, above all others, the "Peruvian guanoes," of which I shall speak further on. The guanoes, which have been deprived of their soluble constituents by rain or sea water, are frequently rich in phosphoric acid, containing mostly phosphates of lime and magnesia, sometimes contaminated with phosphates of iron and alumina, all more or less mixed with carbonate of lime, sulphate of lime, &c., &c.

It would be tedious to enumerate the many localities, and to give the analyses of such phosphatic guanoes. I will mention only Jarvis and Baker's Island, in the Pacific, where rich phosphates of lime occur, mixed with gypsum or hydrous sulphate of lime; and the islands in the Carribean sea, near the coast of Venezuela, which furnish the so-called "Columbian guano," amongst them prominently Bird's Island, Orchilla, and Monk's Island; then the Swan Islands, near the coast of Honduras; Sombrero and Navassa.

At present none of these islands furnish phosphates for this market, with the exception of the two latter, Sombrero and Navassa, from which still small quantities of rock guano are imported, which are employed in the manufacture of fertilizers, used in this Commonwealth.

All the others have been driven from this market since the development of the beds of phosphatic nodules in South Carolina, which were discovered in August, 1867, and from which phosphates can be furnished for less than the freight from the other sources would amount to. Should the deposits in the neighborhood of Charleston, S. C., ever be exhausted, the phosphates from the numerous other localities would again find a ready market.

8 and 9. Sombrero and Navassa Guanoes.

As the phosphatic guanoes of Sombrero and Navassa are still used in the manufacture of fertilizers, I will give the analyses of average samples from cargoes, imported into this city and Baltimore, for comparison with the phosphatic nodules of South Carolina:

	Sombrero.		Navassa.	
	1.	*2.*	*1.*	*2.*
Moisture,	3.07	2.84	7.90	10.70
Organic matter,	2.40	2.50	21.30	20.77
Ferric oxide and alumina,	3.03	2.19		
Magnesia,	0.60	0.62	0.29	0.37
Lime,	46.43	46.48	36.68	35.99
Phosphoric acid,	32.89	31.92	31.93	30.57
Carbonic acid,	8.73	10.47	1.90	1.60
Sand,	2.45	1.05	. .	. .
Undetermined,	0.40	1.93	. .	. .

From numerous analyses, I find the average yield of Sombrero and Navassa guano about 30.5 per cent. of phosphoric acid, equal to 66.58 per cent. of bone phosphate of lime.

10. South Carolina Nodules.

The average yield of the last 25 analyses of "South Carolina phosphatic nodules," which I have made, gave me 23.7 per cent. of phosphoric acid, equivalent to 51.74 per cent. of bone phosphate of lime.

II. Potassic Raw Materials.

Since the discovery of the inexhaustible potash beds in the rock salt mines of Stassfurt, Leopoldshall, &c., in Prussia, the use of salts of potash has rapidly increased in the manufacture of artificial fertilizers.

There are principally three salts, which are employed for this purpose, the sylvite, or muriate of potash, the sulphate of potash, which is usually made from the muriate, and kainite, a mixture of sulphates of potash, soda, and magnesia, in variable proportions.

As I have made no complete analysis of either of these salts, I insert the analyses of Professor C. A. Goessmann, from his fourth annual report to the Massachusetts Board of Agriculture:

1. Muriate of Potash.

The samples were obtained from dealers in Massachusets.

	1.	2.	3.	4.
Potassium oxide, . . . =	50.70	52.89	50.42	52.40
Sodium oxide, ... =	7.84	7.20	8.73	8.89
Chlorine, ... =	49.33	. .	47.94	. .
Moisture, ... =	2.60	2.50	3.67	. .
Insoluble matter, (in water,) =	0.80	. .	. .	0.44

They contain from 80 to 84 per cent. of muriate of potash, (chloride of potassium,) and were sold at retail from $55 to $60 per ton of 2,000 pounds, or from 5½ to 6 cents per pound of potash, making the muriate of potash one of the cheapest sources of potash for agricultural purposes.

I do not know their present price, but as it is also the best source for the manufacture of saltpeter for gunpowder, the present war between Russia and Turkey must have advanced the price to a considerable extent.

2. *Sulphate of Potash.*

As there is a better demand for sulphate of potash than for the muriate, on account of the superior fertilizing properties of the former, a large portion of the muriate imported from Germany is, in Boston and New York, converted into sulphate of potash by means of sulphuric acid. The product consists chiefly of sulphates of potash and soda, with more or less free sulphuric acid, or rather with an admixture of acid sulphates of potash and soda.

Doctor Goessmann gives the following analyses:

	1.	2.	3.
Potassium oxide, ... =	35.44	33.40	30.82
Sodium oxide, ... =	5.50	4.50	8.59
Calcium oxide, ... =	Trace.	Trace.	Trace.
Magnesium Oxide, ... =	Trace.	Trace.	Trace.
Sulphuric acid, ... =	52.10	59.30	42.34
Insoluble matter, (in water,) . . =	0.44	0.88	0.60
Moisture, ... =	0.20	0.19	. .

These sulphates were sold at from $60 to $65 per ton, or from 8½ to 9½ cents per pound of potash.

3. *Kainite.*

A large quantity of sulphate of potash in artificial fertilizers is obtained from the so called "Kainite" and "Stassfurt Dungsalt." These are mixtures, in variable proportions, of the minerals: picromerite, a hydrous double salt of sulphates of potash and magnesia, sylvite (chloride of potassium) and rock-salt, (chloride of sodium.) Those richer in potash are usually sold under the name Kainite, (1 and 2,) the poorer as "Stassfurt Dungsalt," (3.)

Doctor Goessman's analyses were made of samples obtained from dealers in Massachusetts.

	1.	2.	3.
Potassium oxide, ... =	25.02	24.82	9.69
Sodium oxide, ... =	Not detd.	7.17	16.36
Magnesium oxide, . . . =	8.40	11.97	4.54
Calcium oxide, ... =	2.92	Not detd.	1.61
Sulphuric acid, ... =	17.62	17.20	9.86
Chlorine, ... =		Not detd.	
Insoluble matter, (in water,)=	2.90	. .	5.17
Moisture, ... =	5.50	5.40	10.00

III. NITROGENOUS RAW MATERIALS.

1. Sulphate of Ammonia.

This salt is imported from Europe in large quantities, but also manufactured in this city and elsewhere, from the ammoniacal liquors, &c., produced at gas-works. It is the most valuable of all the nitrogenous raw materials which, in a pure state, contains 25.75 per cent. of ammonia. Some of the manufacturers of artificial fertilizers in this city use it for their ammoniated superphosphates.

As I made no analyses of any, I give those of Doctor Goessman, of three samples obtained from dealers in Massachusetts:

	1.	2.	3.
Nitrogen, ... =	20.57	20.60	21.00
Ammonia, ... =	25.00	25.18	25.50
Sulphuric acid, ... =	59.30	. .	60.00
Moisture, ... =	2.70	. .	2.00

2. Nitrate of Soda, (Chili Saltpeter.)

This is another very important source of nitrogen for artificial fertilizers, which is sometimes used by manufacturers in this city.

The standard strength prescribed by the Peruvian government is 95 per cent. A sample obtained from a dealer in Boston gave Doctor Goessman:

Nitric acid, ... =60.82
Sodium oxide, ... =35.68
Calcium oxide, ... = 0.13
Magnesium oxide, ... = 0.04
Chlorine, ... = 0.46
Sulphuric acid, ... = 0.08
Insoluble matter, (in water,) . . . . = 0.24
Moisture, ... = 2.00

It contained 95.7 per cent. of nitrate of soda; the amount of nitrogen in this quantity is equivalent to 19.14 ammonia.

It has been sold last year for about four cents per pound; the price has since considerably risen on account of the war in Europe.

3. Slaughter-House Offal.

Much attention has been given in late years to the highly nitrogenous refuse articles of slaughter-houses, fat rendering establishments, &c.; and in this manner large quantities of very valuable materials have been saved for the production of artificial fertilizers. These substances are usually sold under the names: Dried blood, dried meat, nitrogenous matter, animal matter, ammoniacal matter, azotine, cracklings, bone and meat, tanking, &c.

As will be seen from the analyses given below, that their value as fertilizers is even more variable than their names.

The great advantage which all these substances have over others, equally rich in nitrogen, is owing to the fact that their nitrogen is readily converted into ammonia and in this form easily assimilated by the plants.

The following analyses will give an idea of their comparative value:

a. Dried Blood.

Sample 1 is from a dealer in Baltimore, 2, 3, 4, and 5, are from dealers in this city, 6 from the N. W. Fertilizing Company of Chicago.

	1.	*2.*	*3.*	*4.*	*5.*	*6.*
Moisture, ... =	not detd.	49.23	13.14	not detd.	10.69	not detd.
Nitrogen, ... =	12.16	7.21	8.58	13.56	11.86	13.96
Equiv. to Ammonia, =	14.77	8.75	10.42	16.46	14.40	16.95

All the samples contain a small quantity of phosphoric acid, which was not determined.

Their value per ton varies from $30 63 to $59 33, chiefly owing to their state of dryness.

b. Azotine, Azote-Guano—Dried Meat—Animal Matter, Nitrogenous Matter, Cracklings, &c.

Mostly obtained from flesh, which is worthless as food, after the extraction of the fat.

Samples 1, 2, and 3 were obtained from dealers in Baltimore, 4 is Amor, Smith & Son's Azotine, 5 Dey's Azotine, 6 and 7 are from dealers in this city.

	1.	2.	3.	4.	5.	6.	7.
Moisture,	. .	. .	. .	8.54	. .	. .	13.19
Nitrogen,	9.56	7.61	13.68	11.39	10.78	10.65	8.37
Equiv. to Ammonia,	11.61	9.27	16.61	13.83	13.09	12.94	10.16

They all contained an undetermined amount of phosphoric acid.

Their value varies from $32 45 to $58 14 per ton of 2,000 pounds.

c. *Meat and Bone. Tanking.*

Those varieties, which contain considerable quantities of bones, are sold under the names Tanking, or "Meat and Bone."

Samples 1, 2, and 3 are from this market, 4 is from Baltimore, and 5 from Texas.

	1.	2.	3.	4.	5.
Moisture,	. .	11.84	8.31	22.30	9.50
Nitrogen,	4.28	4.13	6.12	3.22	3.71
Equiv. to ammonia,	5.20	5.02	7.43	3.91	4.50
Phosphoric acid,	7.27	18.58	5.70	6.15	17.03
Equiv. to bone ph. of lime,	15.87	40.55	12.44	13.43	37.18
Sand,	. .	. .	. .	. .	14.15

The great difference in the composition of all these refuse articles shows the great necessity of a careful chemical investigation, in order to establish their commercial value.

4. *Fish Guano.*

Under this name, fertilizers of variable value are sold in this market. I give partial analyses of two, (1 and 2,) which I have made, and, for comparison, the analysis of "marine guano," of J. J. Allen's Sons, of this city, (3,) which is published in the fourth annual report of the New Jersey State Board of Agriculture:

	1.	2.	Marine Guano, J. J. Allen's Sons. 3.
Moisture,	. .	42.50	. .
Nitrogen,	8.33	4.12	. .
Equivalent to ammonia,	10.11	5.00	3.58
Phosphoric acid, soluble,	Not determined.		2.66
Phosphoric acid, soluble citr. ammonia,			3.69
Phosphoric acid, insoluble,			1.62
Potash,			1.61

5. *Horn, Hoof, Leather, Hair, Woolen Rags, &c.*

There are several other animal refuse matters which contain a large percentage of nitrogen, and which would be of great value in fertilizers, if they were more readily decomposed; this, however, is unfortunately not the case, and their value as nitrogenous fertilizers is comparatively small. These substances are horn, hoof, leather, hair, woolen rags, &c., and wherever they are found as essential constiuents of manures, the latter should be looked upon with suspicion.

I have analyzed several samples, found in this market, with the following results:

	Ground horn.	Ground hoof.		Horn and hoof.
	1.	*2.*	*3.*	*4.*
Nitrogen, ...	=13.18	12.57	13.07	13.14
Equivalent to ammonia, . . .	=16.00	15.27	15.86	15.96
Phosphoric acid, ...	= 2.37	Not determined.		
Sulphuric acid, ...	= 0.57	"	"	
Lime, ...	= 3.02	"	"	
Magnesia, carbonic acid, &c., . .	= 0.86	"	"	

	Leather refuse.	Hair refuse.
	5.	*6.*
Nitrogen, ...	= 4.65	6.57
Equivalent to ammonia, ...	= 5.65	7.98

6. *Castor Bean Pomace.*

I will here mention another valuable source of nitrogen, which lately has been used advantageously in the manufacture of artificial fertilizers; it is the castor bean pomace. Its constitution is readily destroyed, and its nitrogen easily assimilated by plants.

The analyses which I have made gave the following results:

	1.	*2.*	*3.*	*4.*	*5.*
Moisture, ...	= 8.94	6.85	7.98	6.34	9.36
Nitrogen, ...	= 5.71	6.97	7.33	7.28	6.82
Equivalent to ammonia;	= 6.94	8.46	8.90	8.84	8.28

This gives, on an average, 8.28 per cent. of ammonia, or 165.6 pounds per ton of 2,000 pounds, equal to $28.98.

IV. NATURAL FERTILIZERS.

Several guanoes, containing a portion of their phosphoric acid in an assimilable form, and, besides, nitrogenous compounds and salts of ammonia and potash, are used as fertilizers, without previous manipulation.

1. Moro Phillips' Serreno Guano.

The analysis of this guano has been made by Doctor T. R. Wolf, State Chemist of Delaware, and has been kindly communicated by him. He found:

Soluble and precipitated phosphoric acid, = None.
Insoluble, = 15.96
Ammonia, = 0.75
Potash, = 0.69

A ton of 2,000 pounds contains:

319.2 pounds of phosphoric acid, worth,	$12 77
15 pounds of ammonia, worth,	2 63
13.8 pounds of potash, worth,	97
	$16 37

2. Guanahani Guano.

This seems to be a "bat" guano. It is imported from the island Guanahani, or San Salvador, in the Bahamas, by the Guanahani Guano Company, and is sold by its general agent, Mr. W. R. Griffith, of Baltimore, from whom the sample for analysis was received. It contains:

Phosphoric acid, =12.19
Equivalent to bone phosphate of lime, =26.61
Nitric acid, = 3.01
Equivalent to ammonia, = 0.94
Sulphuric acid, = 0.81
Potash, = 0.20
Soda, = 0.63
Lime, =18.16
Magnesia, = 0.52
Nitrogen, (additional,) = 2.03
Equivalent to ammonia, = 2.47

A portion of the phosphoric acid is soluble in citrate of ammonia, but the amount has not been determined.

The value of a ton of this guano would be:

243.8 pounds of phosphoric acid, worth,	$9 75
68.2 pounds of ammonia, worth,	11 94
4 pounds of potash, worth,	28
	$21 97

3. Peruvian Guano.

From a pamphlet, issued January, 1877, by Messrs. Hobson, Hurtado & Co., of New York, the agents of the Peruvian Government, we learn that the sale of this very important fertilizer is now regulated in the following manner:

The agents guarantee the guano to be pure, genuine Peruvian, which has not been damaged by sea water. It is offered for sale in the following brands, viz:

No. 1. Peruvian guano.
No. 1. Peruvian guano—Lobos.
No. 1. Peruvian guano—guaranteed.
No. 2. Peruvian guano.

No. 1. Peruvian Guano,

Is the crude article, as brought from Peru; it is guaranteed to average 10 per cent. of ammonia. The mechanical condition of this brand is *not* guaranteed, and it often contains lumps, which require crushing before using.

The price is $60 per ton of 2,240 pounds, in lots of 10 tons.

Amongst dealers, this brand is known as "Standard Guano;" all others above 10 per cent. are called above standard, whilst those containing less than ten per cent. are below standard.

No. 1. Peruvian Guano—Lobos,

Is the guano from Lobos island, or Lobos Point, in Peru. It is sold under the same guarantee as No. 1 Peruvian Guano, as to its genuineness, absence of sea-water damage, and mechanical condition, and is warranted to analyze by the cargo, at the time of arrival, 6 per cent. of ammonia. It often contains 7 per cent., and is rich in phosphoric acid and potash. The price of this brand in parcels of 10 tons, is $51 per ton of 2,240 pounds.

No. 1. Peruvian Guano—guaranteed.

This is a genuine Peruvian Guano, which after discharge from the vessel, has been overhauled, the lumps have been crushed, and the stones and other impurities have been removed by screening. The guano is therefore in a purer condition than when imported. Every condition that could interest the farmer is guaranteed. It is warranted to be genuine, free from sea-water damage, and in a dry powdery condition, fit for immediate use in the drill. It is sold by actual analysis, which is printed on every bag.

The retail price per ton of 2,000 pounds is the sum of its valuable constituents, charged at the following rates:

For ammonia,	17½	cents per pound.
For soluble phosphoric acid,	10	do. do.
For reverted phosphoric acid,	8	do. do.
For insoluble phosphoric acid,	2	do. do.
For potash,	7½	do. do.

No. 2. Peruvian Guano.

This is mostly consumed in Peru, and only a few small cargoes have been sent to New York as an experiment.

It comes from the lower beds of the guano deposits, and consequently contains much more sand than is ever found in No. 1 Peruvian Guano.

It is sold by analysis, the retail price per ton of 2000 pounds is fixed at the following rates, for the fertilizing ingredients:

For ammonia,	17½	cents per pound.
For phosphoric acid,	8	do. do.
For potash,	7½	do. do.

I have made the following analyses of Peruvian Guanoes:

"*Standard X per cent. Guano*"—*cargo* "*Andrew Johnson.*"

Soluble phosphoric acid, ... = 3.19 per cent.
Precipitated phosphoric acid, ... = 8.54 do.
Insoluble phosphoric acid, ... = 0.24 do.
Ammonia, ... =10.39 do.
Potash, ... = 2.90 do.

Value: 234.6 pounds sol. and prec. phosphoric acid, @ 10 cents, =$23 46
4.8 pounds insoluble phosphoric acid, @ 4 cents, . . = 19
207.8 pounds ammonia, @17½ cents, ... = 36 37
58. pounds potash, @ 7 cents, ... = 4 06

$64 08

"*Lobos Guano*"—*cargo* "*Norseman.*"

Soluble phosphoric acid, ... = 2.51 per cent.
Precipitated phosphoric acid, ... =16.50 do.
Insoluble phosphoric acid, ... = 2.35 do
Ammonia, ... 5.77 do.
Potash, ... = 2.35 do.

Value: 380.2 pounds sol. and prec. phosphoric acid, @ 10 cents, =$38 02
47 pounds insoluble phosphoric acid, @ 4 cents, . . = 1 88
115.4 pounds Ammonia, @ 17½ cents, ... = 20 20
47 pounds potash, @ 7 cents, ... = 3 29

$63 39

V. Artificial Fertilizers.

1. No. 1 Peruvian Guano—Rectified.

The agents for the Peruvian Government offer for sale, under this name, a pure Peruvian guano, mixed with sulphuric acid. By this means the ammonia, which otherwise would partly volatilize and be lost, is fixed, and is also much less liable to injure the plants.

By the addition of sulphuric acid, the phosphoric acid is also rendered soluble, and is, therefore, more easily assimilated.

All conditions of interest to the farmer are warranted. It is dry, powdery, and the analysis is printed on each bag.

The rectified guano does not represent any particular grade; it may contain 4 per cent. of ammonia, and may contain 10 per cent. and more.

The retail price is regulated at the following rates:

For ammonia,	20	cents	per pound.
For soluble phosphoric acid,	10	do.	do.
For reverted do.	8	do.	do.
For insoluble do.	Nil.		
For potash	7½	do.	do.

2. Dissolved Mejilones Guano.

The Mejilones Island lies on the coast of Peru, and the phosphatic guano found there is the raw material for a rich superphospate of lime, manufactured by Messrs. P. S. Chappell & Son, of Baltimore, who have furnished the sample for analysis. It contains:

Moisture,	=19.56	per cent.
Soluble phosphoric acid,	=17.71	"
Reverted,	= 2.08	"
Insoluble,	= 0.48	"
Ammonia,	= 0.62	"

The value of this fertilizer of one ton of 2,000 pounds is:

354.2 pounds of soluble phosphoric acid,			$35 42
41.6 do.	reverted	do.	4 16
9.6 do.	insoluble	do.	0 38
12.4 do.	ammonia,		2 17
			$42 13

3. Baugh's Challenge Superphosphate.

This is an English fertilizer, and is imported by Messrs. Baugh & Sons, of this city.

The sample for analysis was obtained through the secretary of the Pennsylvania State Board of Agriculture from Mr. John I. Carter, superintendent of State Experimental Farm. It contained:

Moisture, ... = 7.87 per cent.
Soluble and reverted phosphoric acid, . . =30.10 do.
Equivalent to bone phosphate of lime, . . =65.71 do.
Insoluble phosphoric acid, ... = 0.22 do.
Equivalent to bone phosphate of lime, . . = 0.56 do.
Potash, ... = 0.05 do.
Ammonia, ... = 0.085 do.

The value of this fertilizer per ton of 2,000 pounds is:

602 pounds available phosphoric acid, ... $60 20
4.4 do. insoluble do. 0 18

$60 38

4. "*Baugh's Dissolved South Caroilna Rock.*"

Manufactured by Messrs. Baugh & Sons, of this city.

The sample for analysis was sent by the secretary of the Board of Agriculture.

It contained:

Moisture, ... = 4.00 per cent.
Soluble and reverted phosphoric acid, . . =13.62 do.
Equivalent to bone phosphate of lime, . . =29.73 do.
Insoluble phosphoric acid, ... = 5.14 do.
Equivalent to bone phosphate of lime, . . =11.22 do.
Potash, ... = 0.11 do.
Ammonia, ... = 0.23 do.

The value of one ton of 2,000 pounds is:

272.4 pounds soluble and reverted phosphoric acid, =$27 24
102.8 do. insoluble, do. = 4 11
2.2 do. potash, ... = 0 15
4.6 do. ammonia, ... = 0 80

$32 30

5. "*Ammoniated Dissolved Bone.*"

Manufactured by Messrs. Baugh & Sons, of this city.

Sample for analysis received from the secretary of the Pennsylvania Board of Agriculture.

It contained:

Moisture, ... = 3.58 per cent.
Soluble and reverted phosphoric acid, . . =10.15 do.
Equivalent to bone phosphate of lime, . . =22.16 do.
Insoluble phosphoric acid, ... = 0.47 do.
Equivalent to bone phosphate of lime, . . = 1.03 do.
Nitrogen, ... = 3.13 do.
Equivalent to ammonia, ... = 3.80 do.

Value per ton of 2,000 pounds:

203 pounds soluble and reverted phosphoric acid, = $20 30
9.4 do. insoluble do. = 0 38
76 do. Ammonia, ... = 13 30

$33 98

6. "*Whann's Acid Phosphate.*"

Manufactured by Messrs. Walton, Whann & Co., of Philadelphia, and Wilmington, Delaware.

The sample for analysis received from the secretary of the Pennsylvania State Board of Agriculture.

It contains:

Moisture, ... = 4.98 per cent.
Soluble and reverted phosphoric acid, . . = 13.48 do.
Equivalent to bone phosphate of lime, . . = 29.43 do.
Insoluble phosphoric acid, ... = 2.36 do.
Equivalent to bone phosphate of lime, . . = 5.15 do.

The value of one ton of 2,000 pounds would be:

269.6 pounds soluble and reverted phosphoric acid, = $26 96
47.2 do. insoluble, do. = 1 89

$28 85

7. "*Whann's Phosphate,*"

Manufactured by Messrs. Walton, Whann & Co., of Philadelphia, and Wilmington, Delaware. The sample for analysis was sent by the secretary of the Pennsylvania State Board of Agriculture.

It contained:

Moisture, ... = 5.85 per cent.
Soluble and reverted phosphoric acid, . . . = 9.70 do.
Equivalent to bone phosphate of lime, . . . = 21.18 do.
Insoluble phosphoric acid, ... = 3.86 do.
Equivalent to bone phosphate of lime, . . . = 8.43 do.
Potash, ... = 2.27 do.
Nitrogen, ... = 2.24 do.
Equivalent to ammonia, ... = 2.72 do.

One ton of 2,000 pounds contains:

194 pounds soluble and reverted phosphoric acid, worth, ...	$19 40
77.2 pounds insoluble phosphoric acid, worth, ...	3 09
45.4 pounds potash, worth, ...	3 18
54.4 pounds ammonia, worth, ...	9 42
	$35 19

8. "*Sun Guano,*"

Manufactured by Messrs. Walton, Whann & Co., of Philadelphia, and Wilmington, Delaware.

The sample for analysis was furnished by the secretary of the Pennsylvania State Board of Agriculture.

The analysis gave:

Moisture,	= 1.50	per cent.
Soluble and reverted phosphoric acid,	= 5.32	do.
Equivalent to bone phosphate of lime,	=11.61	do.
Insoluble phosphoric acid,	= 3.07	do.
Equivalent to bone phosphate of lime,	= 6.70	do.
Potash,	= .18	do.
Nitrogen,	= 1.67	do.
Equivalent to ammonia,	= 2.03	do.

The value of one ton of this fertilizer is as follows:

106.4 pounds sol. and reverted phosphoric acid,	=$10 64
61.4 pounds insoluble phosphoric acid,	= 2 46
3.6 pounds potash,	= 25
40.6 pounds ammonia,	= 7 11
	$20 46

9. "*Lennig's Dissolved South Carolina Rock,*"

Manufactured by Mr. Charles Lennig, of Philadelphia. The sample for analysis was sent by the secretary of the Pennsylvania State Board of Agrculture.

It contained:

Moisture,	= 1.98	per cent.
Soluble and reverted phosphoric acid	= 9.66	do.
Equivalent to bone phosphate of lime,	=21.09	do.
Insoluble phosphoric acid,	= 6.76	do.
Equivalent to bone phosphate of lime,	=14.76	do.

The value of one ton of this fertilizer is:

193.2 pounds of sol. and reverted phosphoric acid,	=$19 32
135.2 pounds of insoluble phosphoric acid,	= 5 41
	$24 73

10. "*Moro Phillip's Phosphate,*"

Manufactured by Mr. Moro Phillips, Philadelphia.

The sample for analysis was received from the secretary of the State Board of Agriculture, and contained:

Moisture, ... = 4.23 per cent.
Soluble and reverted phosphoric acid, . . . = 8.94 do.
Equivalent to bone phosphate of lime, . . =19.52 do.
Insoluble phosphoric acid, ... = 5.85 do.
Equivalent to bone phosphate of lime, . . =12.77 do.
Potash, ... = 1.82 do.
Nitrogen, ... = 1.75 do.
Equivalent to ammonia, ... = 2.13 do.

One ton of 2,000 pounds contains:

178.8 pounds soluble and reverted phosphoric acid, . =$17 88
117 pounds insoluble phosphoric acid, ... = 4 68
36.4 pounds potash, ... = 2 55
42.6 pounds ammonia, ... = 7 46

$32 57

11. "Phuine,"

Manfactured by Mr. Moro Philips, of Philadelphia.

The sample for analysis was received from the secretary of the State Board of Agriculture, and contained:

Moisture, ... = 4.95 per cent.
Soluble and reverted phosphoric acid, . . =10.03 do.
Equivalent to bone phosphate of lime, . . =21.91 do.
Insoluble phosphoric acid, ... = 4.89 do.
Equivalent to bone phosphate of lime, . . =10.68 do.
Potash, ... = 0.24 do.
Nitrogen, ... = 2.55 do.
Equivalent to ammonia, ... 3.10 do.

The value of one ton of 2,000 pounds, is as follows:

200.6 pounds soluble and reverted phosphoric acid, . =$20 06
97.8 pounds insoluble phosphoric acid, ... = 3 91
4.8 pounds potash, ... = 34
62 pounds ammonia, ... = 10 85

$35 16

12. "Genuine Phosphate,"

Manufactured by Mr. W. H. Jones, of Philadelphia, and sent for examination by the secretary of the Pennsylvania State Board of Agriculture. It contains:

Moisture, ... = 4.35 per cent.
Soluble and reverted phosphoric acid, . . . =12.68 do.
Equivalent to bone phosphate of lime, . . =27.68 do.
Insoluble phosphoric acid, ... = 3.36 do.
Equivalent to bone phosphate of lime, . . = 7.33 do.
Potash, ... = 0.09 do.
Nitrogen, ... = 1.20 do.
Equivalent to ammonia, ... = 1.53 do.

The valuation of one ton of 2,000 poounds, gives as follows:

253.6 pounds soluble and reverted phosph. acid, . . =$25 36
67.2 pounds insoluble phosph. acid, ... = 2 69
1.8 potash, ... = 13
30.6 pounds ammonia, ... = 5 36
$33 54

13. "National Soluble Bone,"

Manufactured by the "United States Fertilizing and Chemical Company," of Philadelphia, who furnished the sample for analysis. It contains:

Moisture, ... = 8.20 per cent.
Soluble phosphoric acid, ... =11.08 do.
Equivalent to bone phosphate of lime, . . =24.19 do.
Reverted phosphoric acid, ... = 3.54 do.
Equivalent to bone phosphate of lime, . . = 7.71 do.
Insoluble phosphoric acid, ... = 0.37 do.
Equivalent to bone phosphate of lime, . . = 0.81 do.

The value of a ton of 2,000 pounds, is as follows:

292.4 pounds soluble and reverted phosphoric acid is worth, . . . $29 24
7.4 pounds insoluble phosphoric acid is worth, ... 30
$29 54

14. "Acidulated Phosphate,"

Manufactured by the New Jersey Chemical Company, of Philadelphia.

The analysis has been made and kindly been communicated by Doctor T. R. Wolf, State Chemist of Delaware. It contains:

Soluble and reverted phosphoric acid, . . =16.63 per cent.
Equivalent to bone phosphate of lime, . . =36.30 do.
Insoluble phosphoric acid, ... = 1.21 do.
Equivalent to bone phosphate of lime, . . = 2.64 do.

The value of one ton of 2,000 pounds, is as follows:

332.6 pounds available phosphoric acid, ... =$33 26
24.2 pounds insoluble phosphoric acid, ... = 97
$34 23

15. "*Ammoniated Superphosphate of Lime*,"

Manufactured by the New Jersey Chemical Company, of Philadelphia, who communicated the sample for analysis. It contains:

Soluble phosphoric acid , ... = 7.48 per cent.
Equivalent to bone phosphate of lime, . . =16.33 do.
Reverted phosphoric acid, ... = 5.63 do.
Equivalent to bone phosphate of lime, . . =12.29 do.
Insoluble phosporic acid, ... = 1.46 do.
Equivalent to bone phosphate of lime, . . = 3.19 do.
Nitrogen, ... = 1.29 do.
Equivalent to ammonia, ... = 1.57 do.

The value per ton is:

262.2 pounds soluble and reverted phosphoric acid, =$26 22
29.2 pounds insoluble phosphoric acid, ... = 1 17
31.4 pounds ammonia, ... = 5 50

$32 89

16. "*Acidulated South Carolina Phosphate*."

This manure is sold by Messrs. Sharpless & Carpenter, of Philadelphia. The analysis has been made by Doctor T. R. Wolf, the State Chemist of Delaware, who favored me with his results, as follows:

Soluble phosphoric acid, ... =12.96 per cent.
Equivalent to bone phosphate of lime, . =28.29 do.
Reverted phosphoric acid, ... = 3.58 do.
Equivalent to bone phosphate of lime, . . = 7.81 do.
Insoluble phosphoric acid, ... = 1.26 do.
Equivalent to bone phosphate of lime, . . = 2.75 do.

This represents the following value per ton of 2,000 pounds:

330.8 pounds soluble and reverted phosphoric acid, =$33 08
25.2 pounds insoluble phosphoric acid, ... = 1 01

$34 09

17. "*Pelican Guano*."

This sample for analysis was procured by the secretary of the Pennsylvania State Board of Agriculture, from Messrs. J. J. Allen's Sons, of Philadelphia, and contained as follows:

Moisture, ... = 4.85 per cent.
Soluble and reverted phosphoric acid, . . =14.84 do.
Equivalent to bone phosphate of lime, . . =32.40 do.
Insoluble phosphoric acid, ... = 3.81 do.

Equivalent to bone phosphate of lime, = 8.32 per cent.
Potash, 1.40 do.
Nitrogen, = 1.16 do.
Equivalent to ammonia, = 1.39 do.

The value of this fertilizer is as follows:

296.8 pounds soluble and reverted phosphoric acid, =$29 68
76.2 pounds insoluble phosphoric acid, = 3 05
28 pounds potash, = 1 96
27.8 pounds ammonia, = 4 87
$39 56

18. "*High Grade Phosphate,*"

Manufactured by the Farmers' Bone and Fertilizing Company, of Philadelphia. The sample for analysis was received from the secretary of the Pennsylvania State Board of Agriculture. It contains:

Moisture, = 6.65 per cent.
Soluble and reverted phosphoric acid, = 7.53 do.
Equivalent to bone phosphate of lime, =16.44 do.
Insoluble phosphoric acid, = 5.26 do.
Equivalent to bone phosphate of lime, =11.48 do.
Potash, = 0.50 do.
Nitrogen, = 1.67 do.
Equivalent to ammonia, = 2.03 do.

The value of one ton of this fertilizer is as follows:

150.6 pounds soluble and reverted phosphoric acid,=$15 06
105.2 pounds insoluble phosphoric acid, = 4 21
10 pounds of potash, = 70
40.6 pounds of ammonia, = 7 11
$27 08

19. "*High Grade Nitro-phosphate.*"

This is also manufactured by the Farmers' Bone and Fertilizing Company, of Philadelphia, and the sample for analysis was sent by the secretary of the Pennsylvania State Board of Agriculture. It contains:

Moisture, = 8.43 per cent.
Soluble and reverted phosphoric acid, = 8.05 do.
Equivalent to bone phosphate of lime, =17.57 do.
Insoluble phosphoric acid, = 4.56 do.
Equivalent to bone phosphate of lime, = 9.95 do.
Potash, = 2.00 do.
Nitrogen, = 1.70 do.
Equivalent to ammonia, = 2.06 do.

This composition represents the following value per ton:

161	pounds of soluble and reverted phosphoric acid,	=$16 10
91.2	pounds of insoluble phosphoric acid,	= 3 65
40	pounds of potash,	= 2 80
41.2	pounds of ammonia,	= 7 21
		$29 76

20. "*Improved Acid Phosphate.*"

This, also, is manufactured by the Farmers' Bone and Fertilizing Company, of Philadelphia. A sample, furnished by the secretary of the Pennsylvania State Board of Agriculture, contains:

Moisture,	= 3.52	per cent.
Soluble and reverted phosphoric acid,	= 9.49	do.
Equivalent to bone phosphate of lime,	=20.72	do.
Insoluble phosphoric acid,	= 8.14	do.
Equivalent to bone phosphate of lime,	=17.76	do.
Nitrogen,	0.45	do.
Equivalent to ammonia,	= 0.54	do.

One ton of this fertilizer is worth, as follows:

189.8	pounds soluble and reverted phosphoric acid,	=$18 98
162.8	pounds insoluble phosphoric acid,	= 6 51
10.8	pounds ammonia,	= 1 89
		$27 38

21. " *Tree, Vine, and Plant Fertilizer,*"

Manufactured by the Farmers' Bone and Fertilizing Company, of Philadelphia. The sample for analysis was sent by the secretary of the State Board of Agriculture, and contains:

Moisture,	= 3.28	per cent.
Soluble and reverted phosphoric acid,	= 4.60	do.
Equivalent to bone phosphate of lime,	=10.04	do.
Insoluble phosphoric acid,	= 0.20	do.
Equivalent to bone phosphate of lime,	= 0.43	do.
Potash,	=14.86	do.
Nitrogen,	= 2.98	do.
Equivalent to ammonia,	= 3.63	do.

The value of one ton, of 2,000 pounds, of this fertilizer, is as follows:

92	pounds soluble and reverted phosphoric acid,	= $9 20
4	pounds insoluble phosphoric acid,	= 16
297.2	pounds potash,	= 20 80
72.6	pounds ammonia,	= 12 71
		$42 87

22. "*Ammoniated Bone Phosphate.*"

Sold by Messrs. Passmore & Cope, Chester county, Pa. The sample was sent for anlysis by the secretary of the Pennsylvania State Board of Agriculture, and contains:

Moisture, ... = 4.20 per cent.
Soluble and reverted phosphoric acid, . . = 9.68 do.
Equivalent to bone phosphate of lime, . . =21.13 do.
Insoluble phosphoric acid, ... = 0.27 do.
Equivalent to bone phosphate of lime, . . = 0.59 do.
Nitrogen, ... = 2.19 do.
Equivalent to ammonia, ... = 2.66 do.

The value of one ton of this fertilizer is as follows:

193.6 pounds soluble and reverted phosphoric acid, =	$19 36
5.4 pounds insoluble phosphoric acid, ... =	22
53.2 pounds ammonia, ...	9 31
	$28 89

23. "*Buffalo Ammoniated Bone Superphosphate,*" *or* "*Honest Fertilizer,*"

Manufactured by Mr. L. L. Crocker, Buffalo, N. Y. The sample for analysis was furnished by the secretary of the Pennsylvania State Board of Agriculture. It contains:

Moisture, ... = 9.93 per cent.
Soluble and reverted phosphoric acid, . . =11.52 do.
Equivalent to bone phosphate of lime, . . =25.15 do.
Insoluble phosphoric acid, ... =12.22 do.
Equivalent to bone phosphate of lime, . . = 4.85 do.
Potash, ... = 0.13 do.
Nitrogen, ... = 3.10 do.
Equivalent to ammonia, ... = 3.76 do.

It contains, in one ton of 2,000 pounds:

230.4 pounds soluble and reverted phosphoric acid, worth, ...	$23 04
44.4 pounds insoluble phosphoric acid, worth, ...	1 78
2.6 pounds potash, worth, ...	18
75.2 pounds ammonia, worth, ...	13 16
	$38 16

24. "*Soluble Pacific Guano,*"

Manufactured by the Pacific Guano Company, of Boston, Mass. The sample for analysis was furnished by the proprietors, and contains:

Soluble phosphoric acid, ... = 5.26 per cent.
Equivalent to bone phosphate of lime, . . =11.48 do.
Reverted phosphoric acid, ... = 3.81 do.
Equivalent to bone phosphate of lime, . . = 8.32 do.
Insoluble phosphoric acid, ... = 2.12 do.
Equivalent to bone phosphate of lime, . . = 4.62 do.
Potash, ... = 2.12 do.
Nitrogen, ... = 2.22 do.
Equivalent to ammonia, ... = 2.69 do.

This represents the following values, per ton of 2,000 pounds:

181.4 pounds soluble and reverted phosphoric acid,=$18 14
42.4 pounds insoluble phosphoric acid, ... = 1 70
42.4 pounds potash, ... = 2 97
53.8 pounds ammonia, ... = 9 42
$32 23

25. "*Patapsco Guano*,"

Manufactured by the Patapsco Guano Company, of Baltimore, Maryland, who furnished the sample for analysis. It contains:

Soluble phosphoric acid, ... = 3.26 per cent.
Equivalent to bone phosphate of lime, . . = 7.12 do.
Reverted phosphoric acid, ... = 7.48 do.
Equivalent to bone phosphate of lime, . . =16.33 do.
Insoluble phosphoric acid, ... = 3.13 do.
Equivalent to bone phosphate of lime, . . = 6.83 do.
Nitrogen, ... = 2.98 do.
Equivalent to ammonia, ... = 3.62 do.
Alkaline sulphates, ... =10.35 do.

One ton of this fertilizer contains:

214.8 pounds soluble and reverted phosphoric acid, worth, . . . =$21 48
62.6 do. insoluble do. do. . . . = 2 50
72.4 do. ammonia, do. . . = 12 67
207 do. alkaline sulphates, do. . . . = 2 07
$38 72

26. "*Grange Mixture*,"

Manufactured by the Patapsco Guano Company, of Baltimore, Maryland, who furnished the sample for analysis, which gave:

Soluble phosphoric acid, ... = 4.20 per cent.
Equivalent to bone phosphate of lime, . . = 9.17 do.
Reverted phosphoric acid, ... = 8.32 do.

Equivalent to bone phosphate of lime, . . =18.16 per cent.
Insoluble phosphoric acid, ... = 1.77 do.
Equivalent to bone phosphate of lime, . . = 3.86 do.
Nitrogen, ... = 2.03 do.
Equivalent to ammonia, ... = 2.47 do.
Alkaline sulphates, ... =12.72 do.

According to this analysis the value of one ton would be:

250.4 pounds soluble and reverted phosphoric acid, =$25 04
35.4 do. insoluble do. = 1 42
49.4 do. ammonia, ... = 8 65
254.4 do. alkaline sulphates, ... = 2 54
$37 65

27. "*A B Phosphate.*"

It is manufactured by Messrs. P. Zell & Sons, of Baltimore, Maryland, who sent the samples for analysis, which gave:

Moisture, ... =14.15 per cent.
Soluble phosphoric acid, ... = 5.90 do.
Equivalent to bone phosphate of lime, . . =12.88 do.
Reverted phosphoric acid, ... = 4.90 do.
Equivalent to bone phosphate of lime, . . =10.70 do.
Insoluble phosphoric acid, ... = 2.15 do.
Equivalent to bone phosphate of lime, . . = 4.69 do.
Potash, ... = 1.04 do.
Nitrogen, ... = 2.07 do.
Equivalent to ammonia, ... = 2.51 do

The value of one ton of this fertilizer is as follows:

216	pounds	soluble and reverted phosphoric acid,		worth, . . .	$21 60
43	do.	insoluble	do.	do.	1 72
20.8	do.	potash,		do.	1 46
50.2	do.	ammonia,		do.	8 79
					$33 57

28. "*Popplein's Silicated Superphospate Lime,*"

Manufactured by Popplein Silicated Fertilizer Co., of Baltimore, Maryland. The sample for analysis was received from the secretary of the Pennsylvania State Board of Agriculture.

It contains:

Moisture, ... =17.24 per cent.
Soluble and reverted phosphoric acid, . . =10.34 do.
Equivalent to bone phosphate of lime, . . =22.57 do.
Insoluble phosphoric acid, ... = 1.74 do.

Equivalent to bone phosphate of lime, . . = 3.68 per cent.
Soluble silicic acid, (Diatoms,) . . . . . . =13.07 do.
Potash, ... = 2.80 do.

The value of this fertilizer, taking the diatomous silicic acid at five cents per pound, would be as follows:

206.8 pounds soluble and reverted phosphoric acid, =$20 68
34.8 pounds insoluble phosphoric acid, ... = 1 39
261.4 pounds soluble silicic acid, (Diatoms,) . . . = 13 07
56 pounds potash, ... = 3 92

$39 06

The above analyses show that many of the superphosphates of lime contain too large a quantity of insoluble phosphoric acid, which has comparatively a very small value.

29. Poudrette.

I have an analysis of "Poudrette" from Peysson's Poudrette Company of Philadelphia, which gave:

Phosphoric acid, ... = 2.71 per cent.
Equivalent to bone phosph. of lime, . . . = 5.92 do.
Nitrogen, ... = 1.11 do.
Equivalent to ammonia, ... = 1.35 do.
Potash, ... = 0.32 do.

The value of one ton of 2,000 pounds of this fertilizer is:

54.2 pounds phosphoric acid, ... =$2 17
27 pounds ammonia, ... = 4 73
6.4 pounds potash, ... = 45

$7 35

30. Poudrette.

A sample of "Poudrette" from the Wilmington, Delaware, Poudrette Co., was analyzed by Doctor T. R. Wolf, the State Chemist of Delaware who kindly communicated the result of his analysis, which gave:

Phosphoric acid, ... =0.546 per cent.
Equal to bone phosh. of lime, ... =1.19 do.
Nitrogen, ... =1.07 do.
Equivalent to ammonia, ... =1.30 do.
Potash, ... =0.57 do.

One ton of this Poudrette is worth as follows:

11.9 pounds phosphoric acid, ...	=$ 48
26 pounds ammonia, ...	= 4 55
11.4 pounds potash, ...	= 80
	$5 83

FERTILIZER LAWS.

By Dr. E. L. Sturtevant.

The object of legislation in framing laws, is to direct and compel certain courses of action which are to be in harmony with the best interests of society. The object of regulating by law the methods of sale of fertilizers, is to secure the farmer against frauds in the purchasing of materials, whose value depends upon the chemical constitution, and elements, whose appearance is no index of their value, and in the preparation of which ignorance or willful action can destroy their asserted usefulness, without danger of detection, except through the aid of a chemical expert, and through expensive chemical manipulation. The reason which gives these objects of law prominence in this case, and commends them to the wise consideration of our Legislatures, is that the farmers' prosperity is at the foundation of our national prosperity, and any act which may favorably influence these units of our population, the farmers, must necessarily affect for good the aggregates of which this class forms so large a portion. Another object of great, although secondary importance, is the prevention of the fraudulent dealer and manufacturer, through false claims and poor goods, from cutting under the honest dealer in prices, and thus either bringing ruin to his business or compelling him to be fraudulent in his turn, in order that in his business he too may thrive and live.

Importance of Fertilizers.

The importance of fertilizers in the economy of the farm, is indicated by the immense amount which is manufactured and sold, and whose distribution is among the most well-to-do and prosperous of the farming class. Artificial or commercial fertilizers bear an important relation to the area of land under the highest culture and most judicious management, and are the only sources through which profitable culture can be extended over large districts in excess of the supplies of manure. The farmer who tills but ten acres of land to its maximum yield with his supply of manure, and derives a profit therefrom, without this resource to the commercial supplies, is unable to increase the profits through the cultivation of either ten or twenty acres, and the State is the loser as well as the farmer, and the loss is measured by the amount of waste land which is fitted for the plow, but is not plowed, and the amount of land which bears but half the crop for which an intelligent use of outside resources would fit it. When the manure production of the farm measured the crop production, and the yield of the crop determined the amount of stock which could be kept, and which, in time, supplied the manure, and human intelligence was unequal to the changing of these relations, in a large scale, then the maxim so frequently quoted, of admiring large farms and cultivating small ones, was apposite, and the experience of the old countries of Europe in the diminution of crops with the increase of population and cultivation, showed that as waste accompanied the transference of food to manure, and manure in turn to food, so in time the fertility of the lands decreased. The tumults of imperial Rome, and the cry of the hungry and turbulent populace for bread, has a distinct bearing on our agriculture, if we would study the history of the past, to find instruction for present action, to ward off the perils which always accompany the possibilities of the future. Modern science has determined that plant food exists in other forms than manure, and modern improved practice has proved that plant food from mineral sources is as efficacious as is the same food existing in the excrements of our animals. It has shown that fields may be brought from reduced fertility to a maximum fertility, and yearly produce large crops without the slightest aid from manure. It has shown that the amount of land under tillage may be increased indefinitely, and that it is in the power of the intelligent and progressive farmer to cultivate large farms as thoroughly as smaller ones, and with far greater profit per acre, under circumstances which justify the expenditure of capital in investment. Improved implements and horse labor are now in the reach of all who desire them, and are not only as efficient on large farms as on smaller ones, but even more so, and hence if plant food be present in the land in sufficient quantity, and in the form fitted for the use of the plant, farming may be extended along the lines which develop a profit as far as the capital of the farmer may allow. The one practical question, then, for the further improvement of our husbandry is this of plant food.

Fertilizers contain plant food; hence could fertilizers be supplied the farmers of the State in the quantities suited to their desires, and free of cost, such prosperity would ensue among the farming class as would lead them to be the envied of other classes. The State would supply its own population with the productions of her soil, continue its present exports, and still have a surplus on hand. Food would be abundant and cheap, this would react on commerce and manufactures; population would increase in an astonishing ratio, and the wealth of our empire would be concentrated within her borders. Let us illustrate: During the era of the high currency values during the late civil war, when there was the highest agricultural prosperity throughout the West, with a corresponding development of city population, and industrial centers, say in 1864, Illinois was receiving seventy-five cents per bushel for her corn, $1 55 per bushel for her wheat, and sixty-one cents per bushel for her oats. During the stagnation of 1874, she received but thirty-four cents per bushel for her corn, ninety-one cents per bushel for her wheat, and twenty-eight cents per bushel for her oats; averaging these prices we have ninety-seven cents per bushel in 1864, and fifty-one cents in 1875. Here, a difference in price of fifty-five per cent., makes unexampled depression and unexampled prosperity. The fertility value of these cereals at the present time is about thirty per cent. of their food value; that is, a bushel of these cereals purchased as manure would cost, at retail prices, about thirty per cent. of their cost for food. Remove this difference, and consider the chances of the farmer. An era of prosperity for him would return. These are not intended as exact calculations, but as illustrative; neither do they have much bearing upon the question as to how much the farmer can afford to pay for his plant food. This warning is neccssary to give to prevent unreflecting and illy considered deduction.

Volumes might be devoted to the illustrations of the value of plant food to the farmer; indeed, its very necessity, either as present in the soil, or to be supplied as removed, either by natural or artificial agencies. As concerning the farmer's influence upon its renewal, it must be brought about, either through action upon the soil and through crops, or through the purchase of outside material. Under given conditions, fertilizers are the only resource upon which the farmer can count for the extensive cultivation of his fields, and for profits commensurate with the intelligence which he should be called upon to apply. The value of a fertilizer cannot be known through its appearance or smell. Its value consists in the form wherein its plant food occurs, and in relative quantity. It may have a commercial value, in practice, of $5 to $75 per ton, and yet may be offered for sale at a price far above or far below these figures. We have in mind one fertilizer, whose commercial value is but fifteen cents, and which sells for $15 per ton, and another, whose commercial value is $74, and which sells at $68 per ton. We have also in mind other samples, whose commercial values are $24 88 and $40 66, and yet the shrewdest farmer could neither judge by the taste, smell, nor look, which of the two to purchase at a given price. What protection has the farmer in buying these in quantities too small to allow of his affording to pay for a chemical analysis, or what remedy, even if his analysis shows that he has been swindled into paying double or treble the value? Now it is to be hoped that the use of fertilizers can become general under these conditions, which are in the nature of a lottery, which the farmer's necessities compel him to patronize, and in which, while hoping for a prize, he more often draws a blank. The very value of a fertilizer, and the nature which to possesses whereby its value is concealed from all but the chemist, and the large amounts which yearly pass into the consumers' hands, would indicate the desirability of regulating it by law. Indeed, under these circumstances, it is the part of public policy to so regulate the methods of sale, that the purchaser may not have to buy blindly, and this policy has become a recognized one in many of the leading articles of trade. A fish inspector, in Massachusetts, certifies to the brand of fish, and the man who buys a package of No. 1 mackerel has but to satisfy himself as to the price, knowing just what he is to get, and if the goods do not appear as No. 1, he has his remedy at law. In Chicago, the grain is graded and sold subject to this classification, which comes from inspection, and this cause gives security and steadiness to transfers. So with the trade in pickled meats. In our leading cities the public is protected from adulteration, in theory at least, through the office and duties of a milk inspector. In a word, it is the recognized duty of our best governments to throw a mantle of protection over the citizen in all those interests, where individual action is unable, in practice, to secure a ready remedy for itself.

THE FARM.

The farmer is the producing element of society, and the farm underlies all the other industries. It is the farmer who is the foundation of the trades and commerce, for it is he who furnishes the wherewithal that man may live, and may thus contract those other desires which the manufacturer and tradesman are to fill. If the six millions of persons employed in agriculture in the United States should so increase their prosperity as to develop but one new want, the influence would be immediately perceived in all the centers of trade; and these would be inaugurating a quickening of commerce gratifying to contemplate. If each farmer in the United States should buy each one a plow this year, the manufactories of the country would be unequal to the demand, and would have to increase their factories three-fold. Even the makers of hoes would be unable to meet the demands for one new hoe to a farm. If the productions of cereals alone in the country should be increased but ten per cent., the increase alone would be 350,000 cars, and its transport and handling would give occupation to large numbers of people. Indeed, but a slight increase in the prosperity of farmers, and the reaction would be immediately felt throughout the breadth of the land, and the beneficent effects will extend from the smiling harvest throughout the centers of supply and distribution, and come back to the farm to make the toil less drudgery, and the home pleasures will react, in turn, on the material prosperity and the social and political advantages of the State. Let the legislators who are philosophical patriots consider this, and realize that the good of the aggregates must arise from the good of the units. It is then no ignoble task to legislate for the farmers, and to do for them what has already been done for specified branches of trade which have been more persistent in their claims to attention than has been the farming pursuit, and yet neither are nor have been of equal importance. The farmer should ask for no subsidies, no class legislation, no special facilities detrimental to others while useful to him; he should ask but for the extension of existing practice which shall serve to protect him through official supervision from those dangers which, from the isolated nature of this pursuit, and from his necessities, he cannot guard against of himself. After thus calling attention to the objects which should be accomplished by a law, the importance of honest fertilizers to the farmer, and the important relation of the farmer to the prosperity of the State, let us briefly show what existing laws have accomplished in the way of assisting the farmer. We will examine the agricultural report of the State of Georgia, where there has been a State supervision for two years over the sale of fertilizers. In 1874–75 the average commercial value of the various brands of fertilizers offered for sale in the markets of Georgia was $35 68 a ton, while the average selling price was $50 38 per ton. In 1875–76 the average value of two fertilizers had increased to $44 83, while the selling price decreased to $46 65. In other words, the effect of the passage of and carrying out of the law was to increase the actual value of the fertilizers offered and exposed for sale, sixteen per cent., and to reduce their average selling price seven and four tenths per cent. What wonder, then, that the estimated saving to the farmers of this one State alone was $559,168. Then the increased crop production is of importance to consider.

The yield of corn, a crop peculiarly suited to be grown with fertilizers, was thirty-four per cent. greater the second year than the first, and the cost of production was thirteen per cent. a bushel less. In Massachusetts, a law, giving the methods of sale of fertilizers, was passed in 1874, and we have since to note, in like manner as in Georgia, a yearly improvement in the commercial valuation, and a lowering of the selling price. As for the state of the fertilizer market before the passage of the law, we are unfortunate in having no reliable data to offer, but only in a general connection that the majority of the brands then sold were of little real value for the farmer to buy, and none of them were priced with reference to their true valuation at present, under the workings of the present law; the use of fertilizers in Massachusetts is becoming quite general, and the good effects are being seen in the increase of area under tillage, and the large crop raised by the better farmers. Indeed, this act of the Legislature which we are considering, opened up a new area in our husbandry, of which we are yearly reaping the fruits.

THE LAW.

From this preamble it must seem conclusive that the interests of the State are largely bound up with her agricultural prosperity, and it must seem reasonably certain that farmers are justified in demanding some legislation affecting their own interests; it must seem certain that regulation of the sale is a practical and useful measure. Let us, therefore, see what is to be expected of a law, and how such expectation may be best fulfilled.

The only thing to be asked for a law to accomplish, is that the farmer can know just the analysis of the article that he is buying, and the seller be held to sell just the article that he represents. This is enough to ask, and seems sufficient. In order that this object may be accomplished, the greatest publicity must be given to the results of the analysis, in order that the same publicity which aids the dealer who complies with the law shall injure the dealer who defrauds. Then trade interest will compel dealers to compete in furnishing the best article at the lowest price, and a failure on the part of any dealer in equaling his published analysis will work most injuriously on his trade. These seem to us to be the only principles which are necessary to be considered in framing a law. The requirements of a guaranteed analysis on each package sold, and the greatest publicity both for those who comply as well as those who evade the law.

FERTILIZERS ON THE EASTERN PENNSYLVANIA EXPERIMENTAL FARM.

By JOHN I. CARTER, *Superintendent.*

Your secretary has very properly limited my proposed remarks on the important question of fertilizers, to a plain recital of their effects on the farm under my charge, as they have been noticed and recorded. I am only to make a notation of facts and am thus enabled to steer clear of those abstruse questions belonging to this subject, the discussion of which might lead me into water beyond my depth.

Before entering upon details, and the announcement of results, it will be well to prepare you for disappointment in the meagerness of the results secured. This scantiness was not due to lack of labor, but to its misdirection, and to its want of systematized purpose.

We have made several thousands of experiments with fertilizers on the different farm crops, and in the various modes of application, enough, indeed, to have pretty thoroughly settled many points, particularly, as far as our soil and circumstances are concerned.

But, unfortunately, much valuable time and labor was wasted in the trial of indiscriminately selected fertilizers, known only by their local name, or that of the maker, with no record of their constituting ingredients, by which we could give credit to any particular component part, or any especial combination of them. They were subject to continual change in the mode of manufacture, and many of them have passed entirely out of the market; hence, the record of their results give but little valuable information. But these experiments, though destitute of important data, very forcibly demonstrate the value of a well selected and judiciously applied commercial fertilizer, as an indispensable adjunct to successful agriculture in eastern Pennsylvania.

I use the word "adjunct" to qualify the place they should hold in well-managed farm operations; and, here I would like to go out of my way a little, to correct an impression somewhat prevalent, that the character of our reports of results of experiments on our Experimental Farm are such as to disparage the use of barn-yard manure, and to discourage its accumulation and saving by our farmers.

Of course, it was not our intention to give any such impression. We fully believe, and all experience has so taught, that the careful and continuous gathering and saving of waste materials, vegetable or otherwise, to be prepared and returned to the soil, as plant food, is an essential, indeed a *paramount* feature of successful farming. It is a part of that general system of small economies, that utilizing of odds and ends, that always secures success in our business.

Perhaps no other business is so dependent as ours for pecuniary success on close attention to small matters; to the care of tools, the careful and economic feeding of stock, the gathering and sale of small surplusses and gleanings, and the judicious turning to account of everything that will add to the fertility of the soil. But farmers must not suppose that after this is all done, they must make *all* the manure they can use, at every hazard, that they must buy additional stock or grain, with manure-making as the sole end in view. And as to *buying* barn-yard manure, I candidly believe, that, under the usual estimates of its selling value, it will be found to be one of the dearest fertilizing materials in the market.

The variableness of its mechanical condition, and of its fertilizing constituents, render a practical estimate of its value too vague and uncertain to make its purchase or sale a satisfactory business transaction.

A few years ago, this was equally true of many of the commercial fertilizers, but a better understanding of this subject, has now made their value a matter of actual estimate, and their purchase an intelligible transaction.

It is to be hoped, therefore, that farmers may be encouraged to increase the productiveness of their farms, by larger purchases of outside fertiilizers. With the business protected by good laws; with a better understanding of the especial needs of the farm or crops; with a juster appreciation of the durability and safety of their application, the farmers of today have opportunies in this direction not heretofore available.

Farmers better understand the classification of fertilizers, and are enabled to select judiciously an article, from the class furnishing the special ingredient they think they want.

In our experiments of the farm, we have found soluble phosphoric acid to be the most needed ingredient for our cereal crops. Fifty to seventy-five pounds to the acre, thoroughly incorporated with the soil, will make a paying increase in every crop throughout a four years' course, lasting better than barn-yard manure, and, in some cases, making an increase over over the natural yield of ten bushels of wheat per acre, after increasing previous crops of corn and oats. For these crops, this fertilizer should be placed well under the surface, where there is sufficient moisture to keep up a constant disintegration of its particles, and a supply of soluble food.

Our experiments show that for corn, it should be plowed under; for wheat and oats, either plowed under or drilled in with the grain. Our soils are mostly micacious, but in some fields have clay enough to make them slightly heavy.

We do not suffer from leaching, as ours is a natural grass land. I presume the soil furnishes nitrogenous matter enough for most cereal crops; and hence we find such fertilizers inefficient, but, as an early spring application for grass, our experiments show good results from their use. We have now growing grass upon which various fertilizers were applied the seventh of April, which shows a difference of several inches in height, in favor of the ammoniacal fertilizers over the natural yield, and the growth and height of the timothy surpasses all others. The very dark green appearance of the three plots upon which we applied sulphate of ammonia, nitrate of soda, and A A nitrogen (an animal manure) is particularly noticeable. The phosphoric acid fertilizers seem to have developed the clover, and the thickening up of the sward from this cause, may make the plots treated with this material yield equally well with the others. Sulphate of lime or potash does but little for us on the grass. Popplein silicated phosphate is making but little show as yet, not more than we might expect to result from the phosphoric acid and ammonia contained in it. Stockbridge's "Grass Formula" is also pointing to results somewhat at variance with the popular theory, as has been the case in every trial with this formula on our farm. The only crops that we have found to be specially benfited by compounded fertilizers are root crops and garden truck. The heavy applications needed to make large yields, would naturally indicate that it was safest to furnish an abundant supply of all the ingredients likely to be wanted by the crop. We have made no specific trial of any of the secondary elements of fertility, such as magnesia, chlorine, manganese, &c., but are trusting that the Board of Agriculture will suggest some definite line of experiments to be carried out on our farm, provided it is approved by the officers of the State college.

In conclusion I wish to express the the hope that the college, the State Board of Agriculture, and the Experimental Farms may, by united action, develop such important facts in matters pertaining to agriculture, that a general interest in the subject may be awakened among all classes; and that such an impetus may given to scientific agriculture as will place our profession among the most popular and profitable.

TABULATED ANALYSIS, BY DR. F. A. GENTH, CHEMIST PENNSYLVANIA STATE BOARD AGRICULTURE.

In order to ascertain the exact condition of the commercial manures sold in the State, the secretary of the board selected seventeen of the leading brands on sale, and, either personally or by a reliable and disinterested agent, obtained samples of the regular stock as sold to farmers; these samples were numbered and sent to the chemist for analysis. The samples in all cases were only known to the chemist by number, and hence it is but fair to claim that they represent the true state of the brand at the time the test was made. The item of commercial value is based upon the valuations as given by the chemist in his regular report:

NAME.	Moisture.	Sol. & Priop. Phos. Acid.	Insoluble Phos. Acid.	Potash.	Ammonia.	Commercial Value.
"Challenge Phos.," Baugh & Sons, Phila.,	7.87	30.10	0.22	0.05	0.08	$60 35
Dissolved S. C. Rock, Baugh & Sons, Phila.,	4.00	13.62	5.14	0.11	0.23	32 30
"Poppleins Silicated Phos.," Baltimore, Md.,*	. . .	5.74	2.70	2.96	. . .	29 72
"Buffalo Honest Phos.," Buffalo, N. Y.,	9.93	11.52	2.22	0.13	3.76	38 16
"High Grade Phos.," Farmer's Fert. Co., Phila.,	6.65	7.53	5.26	0.50	2.03	27 08
"Ammoniated Bone Phos.," Passmore & Cope, Phila.,	4.20	9.68	1.95	0.61	1.46	28 89
Moro Phillips Phos., Phila.,	4.23	8.94	5.85	1.82	2.13	32 57
" " "Phuine,"	4.95	10.03	4.89	0.24	3.10	35 16
"Genuine Phos.," W. H. Jones, Phila.,	4 53	12.68	3.36	0.09	1.53	33 54
"Ammoniated dissolved bone," Baugh & Sons, Penn'a.,	3.58	10.15	0.47	. . .	3.80	33 98
"Pelican Guano," J. J. Allen's Sons, Phila.,	4.85	14.84	3.81	1.40	1.39	39 56
"Sun Guano," Walton, Whann & Co., Phila.,	1.50	5.32	3.07	0.18	2.03	20 46
Lennig's dissolved S. C. Rock. Phila.,	1.98	9.66	6.76	. . .	. . .	24 73
"Whann's Raw Bone Phos.," Walton, Whann & Co., Phila.,	5.85	9.70	3.86	2.27	2.72	35 19
"High Grade Nitro Phos.," Farmer's Fert. Co., Phila.,	8.43	8.05	4.56	2.00	2.06	29 76
Whann's Acid Phos., Walton, Whann & Co., Phila.,	4.98	13.48	2.36	. . .	. . .	28 85
Improved Acid Phos., Farmer's Fert. Co. Phila.,	3.52	9.49	8.14	. . .	0.45	27 38

* Quartz Sand, 13.43. Soluble Silica, (Diatoms,) 11.94.

FOREST AND RAIN-FALL.

AN ADDRESS BY THOMAS MEEHAN.

There is a maxim, very good for myself, as well as gentlemen of your pursuit, good agriculturists, that a man does not know what he can do until he tries. Speaking of good agriculturists, reminds me that when it was announced that I should address you to-day on rain-fall and forests, some of my friends expressed surprise that I should talk on such an "abstract question" as this. How can it matter to a farmer of to-day, if the forests are cut away, if he can sow and reap, and if he can gather the products of the soil? In the language of a certain distinguished individual, we might say, "What has posterity done for me?" Why should I care for posterity? For my part, I cannot assent to that view. I think every great, every patriotic person, has some consideration for his posterity. I think that many questions considered abstract and abstruse are not really so. More of these questions have a practical bearing on the present, than we suppose. They are not of so little moment as many would make them. We have suffered very much, in fact, through our indisposition to discuss little questions. Others have benefited us by taking them up. For instance, we can now cross the Atlantic in ten or twelve days, when it took Cabot one hundred days. Once it took a long time to send messages from Washington to New York; now they are transmitted in a few seconds. Chiefly through Franklin's playing with the kite, string, and key, we accomplished this wonder. Through the experiment with the tea kettle, we have the locomotive. It was through these little matters we have got these practical workings. In regard to this question of forestry and rain-fall, you know what it is. It has been told in every paper and magazine. There is the Desert of Sahara, embracing four million square miles, where rain never falls. In our desert of America, extending along from Texas to British North America, rain does not fall. They say that is the clearing away of forest, and that we are now suffering from the devastation and destruction of forests by some ancient people. I think we can show that that desert was brought about not by the cutting away of trees. We think that that is the result of sudden geological causes, and that those sudden geological causes are continuous, and that they have no reference to forestry in any shape or form. Before, however, going into that question, it would be as well to take up frankly, or come down to little things, and first explain what causes currents of water in the atmosphere—condensation of moisture before rain-fall, and although it may seem almost a common-place matter to refer to such little things, yet I think it will enable us to explain our position better by referring to them. Take a pitcher of cold water on a warm day; moisture gathers on the outside of the pitcher, and we commonly say that the pitcher sweats, but it does not. It is simply the moisture in the atmosphere, which, being warmer than the outside of the pitcher, causes the water to condense. The same process is going on over the surface of the globe. Three-fourths of the globe is water, and the average evaporation is about twelve thousand pounds per square foot per annum. Of course, in some places it is less, and in some more. What becomes of this water? It is taken into the atmosphere, and, when brought into a cooler current, it condenses and falls. In regard to the circulation that causes the currents, take a bucket of water, and put a stick into it. The stick floats, not because of the gravitation, but because the water is heavier than the stick. The same principle prevails, if you take a kettle of boiling water.

The upper surface is the hotter, and that forms a continuous circulation, because the cooler presses the warmer to the surface. In that way there is a continuous circuit exhibited by the changes in the specific gravity of the particles. That is going on also in the atmosphere just the same as in the kettle of water, that which is warmest rises to the top. So with the Gulf Stream. The warm water of the tropics forces it upward. Thus there is a continuous circuit toward the poles, where it is cooler. Now we can begin to understand how it is that we get rain in some parts of the world and it is dry in others. In sea breezes there is a current of water all the time to the land. The water which is changed into cold vapor, of which I have spoken before, rushes in to take the place of other water in that way. The warm water that makes the vapor is all upon the surface of the earth, is carried along until it comes in contact with a colder surface, and produces rain. Now, as to the American desert, which extends eastwardly from the Rocky Mountains: The water is drawn up from the Pacific ocean; the cold or moist air of the Pacific is brought in over these mountains from that direction. It gives the prevaling easterly winds on that side of the mountains. This vapor is carried along until it reaches the top of the mountains. When it comes in contact with these high ridges it is condensed and becomes snow. When there is any moisture in the current it consequently becomes rain; but here it leaves only a dry current to pass over it. It is only two or three hundred miles this side that it becomes moisture. From this moisture which forms in that way we get another condition, or area, which is continually watered by rain from the clouds. You see, therefore, that this snow or rain-fall this side of the Rocky Mountains, or more properly this side of the Mississippi river, could not have been caused if the Rocky Mountains were not where they are, and it would be a matter of total indifference whether forests were cut away or not. It is a question wholly of currents with these differents parts. This tract of land, which is now a desert, was once covered with forest trees. If you dig down in Illinois or Indiana, you find large beds of coal. Further on, in Colorado and surrounding country, which is now a desert, I have helped to dig out what is called charcoal. I have dug up trees. Some of these stumps, one of them especially, was twenty-four feet in circumference, and others in proportion. These forest trees existed at one time where now the country is a barren desert. It shows that the whole district was once covered with trees, and that they were not cut away. These trees were grown up when the whole range of Rocky Mountains was thrown up in this way. That this was done is shown not only by remains of trees, but by large beds of fossil fish, which exist some five or six thousand feet above the level of the sea, showing that these parts were thrown up from the level of the sea. Then there was no sifting out of the vapor of the clouds, but the moisture fell there in rain, just as it falls over other surfaces of the globe; and the throwing up of the hills afterwards makes this difference. Some parts of the world have these sinking parts as others arise.

In regard to climate, no matter how small may be a cause, it interrupts the regular work of events, and a very small disturbance in these conditions will cause a great change in results. Thus a little rock will fall, and it gradually turns out of its course in consequence a small stream; and having turned it out of its course, in time something else changes, and the whole course is changed by a very little circumstance. And so in nature; and that is the reason we think sometimes there are great changes in the climate. Take for instance the Polaris expedition, and its discovery of an open sea in 1863. In 1875, when Captain Murray's expedition went there, they found this whole tract covered with ice; the thermometer being from 55° to 65° in 1865; then he found it the whole season below the freezing point. It is only the condition of things that come; altering in a few years, and the circle continues to go and come. I thing the best illustration, perhaps, is the history of the grape culture in England, which bears on the change of the climate. We know that England at the present time is considered totally unfit for grape culture; that grapes cannot be raised under any circumstance, and yet we know there was a time when it was covered with grapes. The battle of Hastings, which decided the fate of English people, was fought in a vineyard, and we read of vineyards, the isle of Ely, which signifies "the isle of vines." We have traces of ancient vineyards in every direction. These vineyards continued down to 1685. From that year they were twenty-five years of regular wet and cold seasons, in which it was impossible to ripen the grape; and so until the present day. Now, it seems almost a fable that England ever was a grape producing country; and yet timber was not much cut away. There was no doubt good timber until manufactories became common; and they did not become common until the mining of coal. So there could have been no change in twenty-five years, by cutting away forests from lands wholly fit for the grape to land totally unfit for it. Here comes the most significant part of the history. At the present time, one gentleman in grape culture there, the Marquis of Bute, in Gloucestershire, some years ago planted vineyards, and his grapes are doing just as well now as they did in ancient times. I think this fact shows fully that they did not result in any way from tree culture or forestry. In our own case, we know how the climate changes. I am satisfied that thirty years ago in Philadelphia there never was a year, before or after that, that the lilac did not bloom regularly before the first of May. For the last year or two the same bushes around our dwellings are flowered well before the first of May. There has been no difference in the forests of Pennsylvania. I think there is the same amount of forests in Pennsylvania to-day that there was before that time.

Before railroads and canals were made, there was a great deal more lumber taken to Philadelphia from Pennsylvania then there is now. Timber lands have been suffered to grow up again. I know of property near Philadelphia, where persons desired to leave to their descendants those forests, and now those forests are worth nothing, because timber can be brought from a distance cheaper than it can be bought there. I think Pennsylvania has more woodland than thirty years ago; and there are figures which go to show this. In England there is only about five per cent. of the land covered with forests, and this is probably as much as it has had at once; because England's past forest area was so small that the king set to planting forests for ship building timber; so I think that area has been as it has for many years past, and yet the average rain-fall is forty inches a year. There is Portugal, which is almost destitute of timber, having only 4.40 per cent., and yet the rain-fall is thirty inches a year. And in Spain, with 5.53 acres to the hundred, there is twenty-five inches a year. Sardinia, with twelve per cent. of its land in forest, has a rain-fall of thirty inches. In Switzerland, the forest area is only fifteen per cent.; while in Norway, it is sixty-six per cent., which has a rain-fall of only thirty inches. On the other hand, is Sweden with sixty per cent. in forest, and only sixteen inches of rain a year, and Italy, with comparatively few forests, has forty inches of rain-fall a year. So you see there is not the slighest correspondence. I think it is impossible to give the cause which influences the fall of rain. In our own State there is forest now, and we cannot make much of a test yet. But there has been no diminution in States where the forests have been cut away, for instance in Ohio, which was, we know, a vast timber region when it was first made a State. It has been considerably cleared of its timber; and yet the records kept by the government officers in Marietta show that there has not been the slightest difference in the rain-fall of Ohio. So in some other States the rainfall has not been disturbed. In the New England States considerable attention has been paid to it, but we have been unable to get the figures. Massachusetts, for instance, at the present time has twenty-seven per cent. of its area in forests; Vermont has twenty-six; New Hampshire has twenty-seven; New York, twenty-two; and it is believed that twenty-five per cent. of the whole area of the United States is forest land. The southern country is half forests. West Virginia alone has one million of acres of forest land. I think when it is shown full how much there is even in the Western country, you will see that the whole timber average of the United States is forty per cent. The figures are high, and yet in some of the Southern States they feel that there has been some climatic change; and the timber area continuing the same, the result is that these changes are not due to the absence of forestry, but to geological effects. When you consider the causes which influence rain, and when you compare them with countries where rain falls abundantly, and where it falls sparingly; and when you compare these with the facts as they have been given, you will agree with me that there is no difference in the rain-fall, and that the facts show there is not.

Mr. Calder. I have an intimate acquaintance with Mr. Meehan, and I know he will be very much disappointed if we do not pitch in. He expects us now to pick his address to pieces before he goes away. I hope that as we are hearing continually with reference to the destruction of our forests as influencing our rain-fall—that we are about reducing our country to a desert by the willful destruction of forests—if friend Meehan is in error, let us seek to convert him, and if some of us have been in error, let us now and here make confession.

The Secretary. I would indorse all that Doctor Calder has said. Mr. Meehan has requested me to state that he will be glad to answer any questions; that if he has any information which can be of use, he will be glad to be of service—hence I hope you will feel free to ask him any questions which may occur to you.

Mr. Foresman. I will ask the gentleman a question—whether the cutting away of 300,000,000 feet of pine timber from the western part of the State would affect the eastern part? There is that much cut in the western part of the State every year. If it did affect the rain-fall, would it affect Philadelphia?

Mr. Meehan. It would certainly have an effect, as an abstract principle. It might affect Philadelphia—because if the forests were denuded to the extent that the gentleman says—the land exposed to the action of the sun—and the sun of course drawing, (as we say,) heat to the earth, causing the ascension of a warm current—that warm current drawing in that way, would cause other currents to flow into it. The variation of the current may make a variation in some particular locality. This might be, and as currents which cause rain are usually very high up, and not below, it is not likely to affect, but, as an abstract principle, it may make some difference.

Mr. Wilson, of Juniata. I did not understand your explanation of the cause of the American desert on the east side of the Rocky Mountains. I understood it in part. Why is it that that American desert continues to be a desert? and why does it continue to be a desert so far northward?

Mr. Meehan. I thought I explained that, but probably did not clearly I have watched the clouds coming over those mountains, and they climb over like flocks of sheep. They go over, and then disappear; you cannot see where they go. They go into snow. The current goes on eastward, but no moisture, consequently no rain falls. The current has not time to gather moisture at all, until it goes further on. So it is absolutely impossible that rain should fall there. It has been sifted out from the tops of these mountains.

Mr. Wilson. In the neighborhood of the Missouri and its tributaries, there is forest, is there not?

Mr. Meehan. There is timber all along all rivers; and I am glad that you have mentioned that, because it explains a matter I referred to, but I am afraid of taking up too much of your time. [Several members: "Go on."] There is a statement in English papers which reads as follows: "The Suez canal has produced remarkable results. Ismailia is built on what was a sandy desert, but since the ground has become saturated with canal water, trees, bushes, and other plants have sprung up as if by magic, and with the re-appearance of the vegetation, the climate was changed. Four or five years ago rain was unknown in those regions, while from May, 1868, to May, 1869, fourteen days of rain were recorded, and once such a rain storm that the natives looked upon it as a supernatural event."

There, you see, a large body of water is taken across the desert, and makes the trees grow. The trees could have no influence on the rain; but the moisture, when it is brought into the canal, soaks through the ground, extending probably for miles. The water that springs out at our feet does not come up from there, but from miles away, and may be from the snows of far distant mountains. Almost all our springs come from lakes in that way. Underground rivers continually flow toward the sea, as well as those above ground. Lake Champlain is largely above the level of the sea. Salt Lake is four or five thousand feet above the level of the sea. These lakes continually leak, and the moisture flows in numberless directions under the ground; sometimes flowing for hundreds of miles before coming to the surface. So with the Suez canal; and rain, in some manner, would fall there, for the water brings the current with it. There is a moist current drawn from the canal from every direction. As these currents meet—the warm and the cold—there is no reason why rain might not fall for forty or sixty miles in every direction.

Now, the same principle prevails along those rivers which you referred to; that is, it seems that trees always line the rivers. You can trace these rivers for miles and miles, by the trees that line their banks. There may be more rain in the vicinity of the lines, but not because the trees are there.

Professor Wickersham. I am inclined to think that the views of the gentleman are correct, in relation to forests, and the extent of the rainfall; but, I hear our farmers complaining of the increasing dryness of the ground, and the smallness of the streams. Old farmers tell us that the ground does not maintain the moisture it used to do, and the streams are smaller. This may arise from two causes: When forests are cut away, much more land is exposed, and it may be from the increased rapidity of evaporation. After these forests are cut away, it seems to me likely that the rain that falls upon the ground, would be more rapidly evaporated; and thus with the streams running through surrounding lands. These streams may be larger when the rain falls, and the water will run off more rapidly. Now, if forests retain the moisture longer, and spread the moisture around, it may be that the destruction of the forests has produced all the effects that the farmers have complained of, although the amount of rain-fall may not be decreased.

Mr. Meehan. The fact, sir, is as the gentleman says. There are many streams which, at one time, ran large quantities of water, and which are now dry. But that has no connection with the forestry question. The same laws prevail under ground as on the surface. In their flow under ground, streams are continually meeting with obstructions. After wearing through hard rock, they may come into softer rock, and, like human beings, prefer the easier road. Wells give less water, because streams under ground have turned in some other direction. Take the Mammoth Cave. Every once in a while the water got a softer place to run in than it had before, until it ran out, and left a great highway. That is the reason some streams become dry, but the effect could not have any relation to the trees, because vegetables want water. Three fourths of the rain-fall is actually consumed by the vegetation. Not one fourth of the water that falls finds its way into the streams. It may be much less in a patch of watermelons. The waste wood that you find is three fourths water. Look, therefore, at the immense amounts of water that are consumed. Cut away the trees, and there ought to be more water for the streams. You see how contradictory it is. It seems, therefore, that the cutting away of trees could not lower the streams, and it is not only impossible and without reason, but, however explained and reasoned otherwise, it is on account of the constant change of the underground streams.

Professor Wickersham. Do I understand that the gentleman holds that evaporation is not greater where the trees are cut off than where there are trees growing? Of course, certain portions evaporate. Now, then, I want to know, from the gentleman, whether he takes the position that evaporation in a forest is not less upon the same land, than if the forest were cut away?

Mr. Meehan. The evaporation is greater from forest land, than where it is cut away, because the roots of these trees extend down ten or twelve feet below the surface, and they are as little pumps. The amount of evaporation from the leaves of the trees is enormous. Consequently, your evaporation power is extending twenty-five or thirty feet in depth. When it is cut away, the sun does not descend so deeply. With trees, you have six or seven feet, or more, pumped; so, necessarily, there must be more water escaping by evaporation from forest ground, than where there is no forest.

Mr. Wilson, of Juniata. I think the gentleman's argument is contradicted by the facts. Where forests are, there are often swamps. After cutting away the forest, grass will grow, and the water becomes dry land. I cannot see the effect that Mr. Meehan does. It does seem to me that the rays of the sun have a far greater effect than the roots and the leaves of the trees. Moreover, if the theory of the gentleman is true, if you let the waters of the ocean into the Sahara Desert, every part of that will "blossom as the rose."

Mr. Meehan. I think the gentleman is right, and wrong, too. The surface water, of course, dries up. The wind and sun would dry up the surface water much more rapidly than the trees do. But you will find that there is more evaporation in land with trees than that without. Place a thermometer in a forest, keeping it clear of the evaporation, and the thermometer will go to 110 or 115. Take other land, and you will find 75 or 80. There is a difference of twenty degrees between the temperature of the land covered with grass, and where there is no grass. More moisture will evaporate in 100 than in 75. There is less evaporation in land covered by grass, than in land covered by nothing.

Professor Wickersham. Suppose we take out a cubic foot of land from a forest, take it on the surface, and ascertain the moisture in it, does the gentleman maintain that there is less moisture in that than if we were to cut it out of a bare mountain, of the same kind of land?

Mr. Meehan. I not only know that, but know it from actual experience in both winter and summer.

Mr. Beebe. Take up any elevation of land, elevated, of course, where there are forests, and where there are large springs flowing out. Cut away those forests, and just as you progress, even to a small extent, those springs will dry up. Will the gentleman give us his view of the cause of that? This certainly is the experience.

Mr. Meehan. It probably dried up where the source of the spring is, hundreds of miles away. I have a spring on my property, discovered by the Indians. I know there is as much water there as ever.

Mr. Beebe. Take central New York, were the hills and valleys of that country were just a morass, impenetrable to the earlier settlers, and it has went gradually away. From these hills emanated streams that carried saw-mills and grist-mills. Just as the country has progressed and improved, those streams have ceased to run. This in such numbers that no one can doubt, it seems to me. The valleys themselves have become excellent meadow lands, and fit for cultivation. Why did they?

Mr. Meehan. Of course we should have to be there. It is easy to ask the question, but to answer will require examination into geological details. We know that even in regard to lakes, there is a rising and a falling, owing to their geological conditions. We have an illustration of that in the Salt Lake. Twenty-two or twenty-three years ago it was much lower than now; but since then, and the cutting away of the forests, the lake is gradually rising. It is probably, on an average, six feet higher than when the Mormons first settled there. When they first settled there, the valleys and streams abounded with cotton-wood trees and others; but they have cut away, so that there is scarcely a tree. So for hundreds of miles along the lake shore and inland, the timber has been cut away. The Mormons have, under their president, Brigham Young, planted a number of shade trees, but where a number of them have been set out, they are not higher than the houses. They have a number of fruit trees eighteen or twenty feet high. This is all the planting that the Mormons have done, and yet the lake is rising. I would like to ask, how is this, as well as that, accounted for?

Professor Hamilton. Mr. Meehan has well calculated that. Mr. Marsh, in his book on "Man and Nature," points to a district in France, where once the country was densely populated and full of forests. For some purpose the French government cleared off that district of timber, and in course of years the country became uninhabitable. The rains mostly ceased. If they did come, they came in tornadoes and hailstorms. The government, years after, seeing this, I believe, that the cause was the taking away of the timber of the district, replanted the district again with timber, and to-day the statement is that that district is again fruitful, and inhabited by a large number of citizens.

Now, what is the explanation of these facts, if they are facts, and the conclusion that is drawn, that the barrenness of this country is caused by the clearing away of the forests?

Mr. Meehan. There it is again, we will have to be there to investigate the trouble. I think the first trouble started from that work that is quoted from. I think, if gentlemen will study them, that many of these facts are drifts from newspaper reports, although I am a newspaper man myself, and that they have been extracted by the authors. Yet people will try some of the experiments spoken of by Mr. Marsh, even if they do not come out right.

A man tried a large tract of land with a rain gauge. He tried another gauge, and found more rain than in the other. So another man tried a pine forest, and the rain didn't fall so much there as somewhere else. So the conclusion is, you must grow an oak forest, instead of a pine forest. [Applause.]

As to the government doing these things, you know that governments often do very foolish things. Do the circumstances warrant the government in doing them? You know that the Government of Switzerland once kept bears at the public expense. They found out afterwards that bears were expensive, and killed them, and found they got along as well as before.

Mr. Wilson, of Juniata. Take the Genesee Valley, nothing could live there, without fever and ague. Now that country is in living green, covered with beautiful villages and populous cities, and I am not aware that the Genesee is any lower, or that the water power is any lower than when the country was in forest. It used to be covered with forests, and was a marsh, to a great extent. Now it is a very fertile country, and yet the water power is as good as ever. Rochester was built up by the strength of that water power. Now it seems to me that that contradicts your theory, Mr. Meehan.

The President, [Governor Hartranft.] I would like to have a little further explanation upon one point. It is generally understood that the flow of water in the Susquehanna is much less during the summer season, and is, perhaps, more in the winter, now, than many years ago, and I think it is also true of the Schuylkill.

The same thing is said to be true in reference to many small streams. As I understand Mr. Meehan, he says these water-courses are commonly influenced by geological reasons, and not because the water is held by the timber. Now, as to the rain-fall, that is a question which I am perfectly satisfied with; but it does seem to me that the timber in the northern and western parts of the State, where it has been cut off, is, to some extent, the reason for the less flow of water along the Susquehanna, and some of these streams. When all these streams grow less, and the rain-fall is the same, and no streams increase, there ought to be some other explanation where this water does go.

Mr. Meehan. I am very glad, sir, that you give me the opportunity to explain, for I did not intend to say that under no circumstances have forests had any influence whatever on the course of water, for they have, incidentally, although not a fundamental influence. For instance, if we have a sandy brink to a stream, and the trees are cut away, there will naturally be a greater wash, and by tearing out, to cause the water to find other streams. That is one way in which the cutting away of the trees has an effect.

Then trees on the mountain tops must necessarily tend to hold snow in greater quantities, and thus give the snow more time to melt; whereas if the timber is cut away, nothing prevents the snow running away, and its earlier melting, which makes the streams much higher and afterwards lower. That is the reason why.

My own effort is to show that they have no great fundamental interests in streams or springs; but of course in this and other similar ways they have. The cutting away of timber in the mountain tops, would necessarily interfere with the streams.

The President. Does heavy cannonading for a day, or two days, have any influence upon rain-fall, in your estimation?

Mr. Meehan. I never could see how, unless it interfered with the currents, having the effect of drawing the warm currents and the cold currents together. But I could not depend upon that. I would like to be able to explain this more effectively.

Mr. Waring. We know all the great battles of the country were generally followed by heavy rain-falls.

The President. Very frequently. I had generally to sleep out in those rains. I remember that quite vividly.

Mr. Wilson, of Juniata. I am not satisfied, even dissatisfied. I want to hear more on this question.

A Gentleman. I am a little like the German who heard one side: "I beeleeves mit him." After hearing the other side, then he exclaimed: "And now I don't know mit whom to vote." [Laughter.]

Mr. Edge, [Secretary.] I would suggest that this board is not prepared to recommend the legislation asked for.

Whereupon the discussion was closed.

TREE PLANTING FOR SHADE, SHELTER, AND PROFIT.

By Prof. S. B. Heiges, of York.

In the preparation of a paper upon the above named topics, we feel that we will be obliged to consider much that cannot be called novel, or, in other words, we shall, in order to discuss the subject so as to be instructive and profitable, say and do what has been said and done, perhaps a thousand times before.

There are certain conditions of nature that must be observed; certain physiological principles that must be respected; certain relations of species, soil, climate, and altitude that debar much originality of thought and deduction, for, from the period when "the Lord God took the man and put him into the garden of Eden, to dress it and to keep it," down to the present, men have engaged in, and inquired concerning, tree planting.

History, ancient and modern, fully confirms, on many a page, the fact that many of the most noble characters that ever lived upon the earth, adorned and improved it by planting, and directing the growth of trees.

Trees have been admired—worshiped in many instances—by the various peoples of all times and climes. And yet how little of thought or forethought has been exhibited in many instances, not only in the selection of the kind of tree itself, but, also, in its location.

It is possible to make a home appear cheerful, inviting, hospitable, or dark, secluded, foreboding, by the location, number, and character of its trees. If they be not too closely planted, and are possessed of open, spreading, extended branches, you are silently, but eloquently, invited to enter the home which they surround. On the contrary, trees closely planted, shutting out the view by their dense shade of compact limbs and foliage of a sombre hue, tell the passer by that this is a *private* residence, and that he only is admitted who presents his card.

Thus trees, by careful, studied selection and location, can impart to a residence a cheerful or sad, a scholarly or careless, a refined or debased taste. They, in fact, are an impress of the mind that trained them. Trees planted for *shade* may be utilized in many ways. We notice, in the first place, that they may be made a means of æsthetic culture, by developing an idea of the beautiful in nature, improved by art; that just conceptions of true outlines may be formed; that the beautiful and intimate relations of the parts to the whole, and the whole to the parts may be discovered; that the various types of stateliness, strength, gracefulness, stability—all the elements of form lie within the province of shade trees.

What better school for the student of nature can be imagined than a wisely arranged arboretum, and the trees of a home of airy pretensions may be an humble arboretum for its inhabitants.

Shade, undoubtedly, is an element of health, not that sunshine is not essential, but the deadly effects of the mid-day sun are evident from the many attacks of sun-stroke, (*coup de soleil*,) and the wearing of a few leaves within the hat or bonnet, as a prevention, can be copied upon an ample scale by surrounding our homes with suitable and sufficient shade trees.

Much of the unhealthfulness of cities during the hot months undoubtedly is attributable to their shadeless residences. The public squares have justly been styled "the lungs of cities." Discretion, however, should be exercised in the location of trees. No grounds are complete, as far as shade is concerned, that do not have evergreen and deciduous trees properly proportioned in number and variety. How frequently are the evergreens seen located closely to the buildings on the south side, whilst the deciduous trees are all placed upon the north side.

A moment's reflection should convince any one of the error of such a plan. During the dark and damp days of winter we want as much sunlight as possible upon the building. Now, this is obtained by reversing the order; placing the deciduous trees upon the south, that the leafless branches may allow the sunshine to even enter the building with its cheerful and healthful rays. We do not object to evergreen trees upon the northern view, if the grounds be sufficiently ample so that they may be placed at proper distance from the building. We emphasize: Health is of more importance than the most pleasing display of ornamental trees, even if the latter must be sacrificed to maintain the former.

There must be a selection of such varieties as will not grow out of proportion to the grounds upon which they are planted, *i. e.*, large grounds will appear more effective with massive, wide-spreading trees; smaller grounds with trees of less extended growth.

Dwarfed trees exclusively would be out of taste upon a lawn containing an acre or more, whilst the giant oaks, and elms, and maples would be illy suited to the unbuilt portions of an ordinary town lot.

A lover of trees would have no trouble in selecting from the following list such as are possessed of all of the elements of form, size, hardness, and longevity:

DECIDUOUS

Red maple, (acre rubrum,) sugar maple, (a saccharinum,) Norway maple, (a platanoides,) silver maple, (a dasycarpum,) black sugar maple, (a sac nigrum,) chestnut, (castanea vesca,) horse chestnut, (æsculus hippocastanum,) buckeye, (a gla bra,) tree of heaven, (ailanthus glandulosus,) red oak, (quercus rubra,) black oak, (q. tinctora,) white oak, (q. alba,) swamp chestnut, (q. primus,) black walnut, (juglans nigra,) English walnut, (j. regia,) locust, (robinia psendacacia,) lindens, (tilia Americana, tilia Europaæ,) beech, (fagus fermginæ,) English beech, (f. sylvatica,) hickory, (carya alba,) pecan nut, (c. olivæ formis,) magnolia, acuminata, and umbrilla, tulip poplar, (tiriodendron tulipifera.)

EVERGREENS.

White pine, (pinus strobus,) rhotan pine, (p. excelsa,) red pine, (p. resinosa,) Corsican pine, (p. larico,) Austrian pine, (p. Austriaca,) Norway spruce, (abies excelsa,) black spruce, (a. nigra,) white spruce, (a. alba,) hemlock spruce, (a. Canadensis,) balsam, (a. balsamæ,) European silver fir, (a. pectinata,) Crimean silver fir, (a. Nordmaniana,) Siberian silver fir-(a. pichta,) Lawsonis cypress, (Cupressus Lawsoniona,) American arbor vitæ, (thuja occidentalis,) Chinese arbor vitæ, (t. orientalis,) European larch, (larix Europaæ.)

We have placed in a concise list trees well adapted for the three purposes contemplated in this paper.

Of deciduous trees for shade we would name Norway and sugar maples, English elms, tulip tree, horse chestnut, and Ohio buckeye as being excellent varieties. Of these for rapid growth, hardiness, beautiful foliage, early and long continued shade, we place Norway maple at the head of the list.

For early and dense foliage, beautiful bloom and perfect outline of form, nothing is superior to the horse chesnut. As a street or avenue tree, it stands without a rival; in fact the pruning knife can very seldom improve its natural form. (Its slow growth is the only objection that can be offered against it.)

Of evergreens we know nothing better than Norway spruce, black spruce American arbor vitæ, white spruce, balsam, and Lawson's cypress. This short list contains different shades of foliage, different degress of compactness, erect and drooping habits of growth, and undoubted hardiness. The elm stands forth prominently as the most suitable tree for ornamentation of the college *campus*.

Whether it be the result of association—often the basis of taste—or whether of some property or quality possessed by the tree itself, we know not, but that they impart an intellectual, a classical air to the buildings which they surround, has been noticed by many a careful observer. They appear to best effect when the buildings present an ancient mien, and as institutions of learning should become more valuable as they assume the air of age, the law of harmony is more clearly defined by the presence of trees that only reach perfection with many, many years of growth. The lindens, too, are possessed of qualities fitting them for general use and pleasing effect along lengthy avenues, but their disgusting insect foes, so abundant of late years, will cause us to reject them from the list unless our entomological friends should soon provide us with an effective remedy for the protection of the former by the destruction of the latter. The oaks, "the noble old oaks," whilst scarcely suitable for lawns of humble pretensions, stand the peers of any in public squares, parks, and extended vistas.

But why impose upon the valuable time of this association? We have briefly developed the merits of sufficient varieties for lawns and ordinary sized parks; the professional landscape gardener should invariably be consulted in every enterprise of more ambitious designs and enlarged area

FOR SHELTER.

Trees planted for shade become a means of shelter for man, but shelter, like many panaceas, is "good for man and beast." Provision should, therefore, be made for those animals which man has called around him, and which he has, by kindness and firmness, reduced to domestication. Our present system of farming, by which all our land is subjected to a system of rotation, necessitates the use of every field for pasturage in its regular order. Trees are almost as essential for shade and shelter as a sufficient supply of pure water. Those of us who have studied the habits of the *ruminata* observe their tendency to lie down during the process of digestion. How important that this process should be performed as nearly in accordance with the nature of the animal as possible.

Every field used as a pasture should have at least one widespreading tree of dense foliage under which the cattle can lie when they desire. I lately admired a noble oak, standing in the center of a large field, the owner of which replied, "I have often been tempted to cut it down on account of the poor corn and poorer wheat raised under it." I pointed out to him its importance in the economy of nature, and he is now convinced that the shelter from the noonday sun to his cattle furnishes more of flesh, milk, and comfort than feeding the corn and wheat from an area equal this "shaded spot," and without the trouble of cultivation. Again, there are certain sections of country exposed to winds from certain quarters. How easily can we break the force of the same by properly locating trees so as to form barriers or "wind-breaks." These "breaks," by proper pruning on windward side, can be made to resist almost any tempest, and by trimming to a proper height on leward side, can be made a shelter alike against heat and cold, rain and snow.

For the latter use we would advise evergreens, of long and pendulous branches. There is not the least doubt but that the force of the wind, and, as a result, the climate of a section, can be perceptibly modified, even to such an extent as to materially benefit vegetable and animal life by concerted action in this direction. This, however, should be the labor of the State, rather than of the individual.

Evergreens, undoubtedly, radiate heat during the winter. By planting rows of medium sized evergreens, at moderate distances, among our fruit trees, I have no doubt about rendering our crop of apples, pears, peaches, and plums doubly sure.

A few years ago, S. M. Purple, of Columbia, Pa., showed me a fine crop of peaches, the trees being in alternate rows with arbor vitæ, which had been planted in rows, midway between the peach tree rows, after the latter had been planted, for want of a more suitable place for the evergreens. I could not find peaches in any other location that season. I have since noticed the same result upon my grounds, upon trees planted upon the north, east, and west sides of a dense hedge.

Here, then, is a cheap and permanent means of protection for exposed situations.

FOR PROFIT.

So much of the benefits of trees for shade and shelter accrue to man's pleasure and health, that they should rightfully be set down upon the credit side of the profit account.

We presume, however, that *profit*, in the form of dollars and cents, was meant, when the question was submitted for our consideration.

We would suggest standard pear trees as being one of the most valuable of all varieties for profit. They make an excellent shade, are of rapid growth, come into fruit tolerably early, the fruit can always be disposed of in the natural state, canned or dried, or be converted into wholesome, delicious perry, superior to cider. The wood is valuable for fuel, and the trunk, with the stump carefully dug from the ground, makes the staunchest ship knees.

By the time pear trees now planted have reached mature growth, we may hope that this nation shall have acquired definite views of political economy, and if so, our now almost stagnated ship traffic, with newness of life, will demand all the timber of this kind that our country can produce.

The black walnut, which can easily be raised by planting the nut where the tree is to remain, or by transplanting when one year old, is valuable for its fruit, and also for its lumber, now so extensively used, finished in oil, in our best edifices and in our palace cars, cabinet organs, and expensive furniture.

Corn, potatoes, and other hoed crops, can profitably be raised amongst the growing trees, for quite a number of years. One must not forget that the stump, manufactured into "veneers," often commands a higher price than all the other parts of the tree.

The shag-bark is also a profitable tree as to fruit and timber, and is of easy growth, if treated as the walnut. The nut of the shag-bark can be made to yield large profits by sowing in swamps, otherwise useless, and cutting the young trees for hoop poles.

The chestnut, perhaps, is one of the most valuable timber trees, and is profitable, both for fruit and timber. In fact, a chestnut grove, whose trees are fit for fence posts, becomes as valuable for rails, in the course of twenty years, after the removal of the trees, if the numerous sprouts of each stump be protected until they can care for themselves. We cannot pass, unnoticed, the beautiful *grain* of the chestnut, which renders it so valuable as an in-door timber. It is surpassed by none and equalled by few.

The locust, in sections of our State, not infested by the locust borer, (*clytus robinial*,) is one of our most profitable timber trees. It also is not without merit as a shade tree. Its beautiful and fragrant bloom, followed by a dense foliage, renders it a tree not to be discarded by any means in an extensive collection. Its durability renders it very valuable for fencing and vine supports. One of Pennsylvania's veteran fruit growers lately informed me that, if he had planted his lands with locust trees forty years ago, he would have made twice as much as he has by fruit culture, and with much less labor and expense.

So long as our laws relating to highways are based upon the unjust principle of fencing wandering cattle out—not fencing farm stock in—so long will farmers pay their heaviest tax for a purpose not in the least beneficial. If it be possible, this association should devise some means by which this valuable tree can be grown successfully throughout our entire State. It appears to flourish in all varieties of soil, dry and moist, equally well, upon mountain side and in valley. Among woods, it stands as the Concord among grapes; the friend alike of poor and rich. As a heat producing fuel we have found it superior to the maples and oaks, and but slightly inferior to the hickories.

The ailanthus, from its great tendency to *sucker*, is a wood of profitable culture. We have seen a dense grove formed in a few years, by planting a few trees upon a rocky knoll, which rapidly studded the ground with tall, erect, rapid growing trees. Its durability has not, to my knowledge, been thoroughly tested. It is a wood of high heat producing power. Its disagreeable odor when in bloom suggests the precaution of planting it at a safe distance from our dwellings.

We regret that time will not allow us to consider the claims of other trees valuable in many respects. We hope it will not be assumed that what we have omitted are useless or unworthy of consideration. All are worthy of trial in the list already reported.

It is to be regretted that with the frequent assessments made throughout the State, that no means were provided for estimating the percentage of timber land, the amount of marketable timber, and the amount of fuel per acre.

This association can vastly assist science by using its influence to obtain needful legislation in this direction.

If such data had been furnished from time to time, the vexed question of influence of trees upon rain-fall would have gone to rest with its fathers.

We have found the value of shade in preventing evaporation, by carrying out a system of repeated experiments, (reported in *Gardener's Monthly.*) Ground of equal tenacity, and alike in all other respects, loses about twice as much moisture *per diem* as equally wet ground *protected by shade.*

These experiments were conducted in such a manner as to necessarily leave undiscovered the influence of shade trees upon rain-fall.

Local writers inform us that certain streams in New England, sufficiently powerful to drive saw-mills, dried up as the timber was cut down for sawing.

Professor Orton, in Andes and Amazon, mentions a valley, in a mountainous district, which became less favorable for cultivation after the timber was removed.

The Suez canal whose banks now support, it is said, thousand of trees, is cited as a fit example of climate modified by trees. The water flowing through the canal, by our method of reasoning, rather fitted the climate for the trees than that the trees have modified the climate. Is it not more likely that the soil of certain sections contains only sufficiently soluble material for one growth of trees, and that when these are removed there is nothing restored to the soil to induce a second growth.

Supply this deficiency, as the lesson has been taught us by the Mormons of Utah Territory, and the "desert place will blossom as the rose."

We are fully aware that the influence of forests upon rain-fall is a separate and distinct topic; but if there be any possible means of preventing these frequent destructive droughts, to which great sections of very fertile country are subjected, or any possible means of preventing too excessive falls of rain in others, by extending forest area in the former and contracting it in the latter, it is a duty the State, yea, the nation, owes all sections far more imperative than any legislation ever enacted, as tariffs for protection or tariffs for revenue.

For we thereby arrive at one of the cheapest sources of profit; as all the natural forces labor for man without any recompense.

We wish to bid farewell to all loose generalization, and base our practice upon well authenticated, carefully observed, and scientifically collected facts; then, and then only, can we hope to convert this mass of empiricisms into the science of agriculture. Then, we predict, will man learn that God sends less rain upon the forest as he does upon the ocean, simply because less is needed there.

As far as data are available, it would be as logical to assume that telegraphic wires, and iron and steel rails of our numerous railroads, extending over our country in every direction, affect rain-fall as much as destruction of forests does. Men have noticed, or imagined they have noticed, an appreciable decrease of rain-fall per annum within the last twenty-five years; they have noticed a wholesale destruction of timber in various sections; they couple these two circumstances as cause and effect, and talk learnedly of forest influence, and never stop to inquire concerning the annual rain-fall, much less to keep a rain gauge, which would convince them of the folly of many of their conclusions.

We know that meteorological changes are largely dependent upon electricity. We have frequently found both iron and steel rails, more frequently steel-capped rails, highly charged by an inductive current. In one instance, we found a telegraphic wire, unconnected at either end by a battery, highly charged with electricity; messages have frequently been sent several miles using the earth instead of the line wire.

Hear the following meteorological result, as fairly established as any forest influence upon climate:

The natives say that since the *terre mote* of 1859, the seasons have not commenced so regularly, nor are they so well defined; there are more rainy days in summer than before. [Orton's Andes and Amazon.]

Here are cases that bear as strongly upon the question of rain-fall as forests, yet electricians do not claim them as available forces, because they lack scientific confirmation. It is to be regretted that men who observe least closely are always most easily reconciled to their theories, and most aggressive in advancing them.

I wish it clearly understood that I do not deny to forests the exerting of climatic influence, but I do firmly believe that the fact has not been established by fair, honest, scientific investigation and data. Let us, as a body, carefully move toward the truth, trying all things, holding fast to that which proves good, above all things be loth to announce the result of *guesses*, to as carefully weigh our words as we would the results of the most accurately conducted experiments; then and then only will men place confidence in our deliberations. Then shall our light be of such a nature to the agricultural world that it cannot be hidden under a bushel; yea, it will shine from the top of a hill, even the Capitol hill.

RAIN-FALL.

BY MAJOR S. W. WOODWARD.

[*Published by request.*]

To dwell upon the importance of rain-fall, before a body of agriculturists, would be like arguing the necessity of the presence of soil itself, in which to plant seed for the future crop. It is of no less importance, for without rain, there would not even be facilities for artificial irrigation.

Physiologists assert that animal life is alone begun and developed in water. Botanists may urge greater claims to the presence of this indispensable element, both for germinating the seed, and perfecting the bodies of the vegetable world. There is, probably, not a farmer here, who has not experienced a spell of dry weather, during which he would most willingly have exchanged all that he had accomplished by deep ploughing and rotation of crops, or by the skillful application of the most scientifically manipulated manures, for the benefits to be derived from one rain-fall. A rain-maker, whether from the plains of the West, or from the jungles of Africa, who could have substantiated his pretensions, even in a limited way, could, last year, have exacted from our people all over the South, a willing tribute of the millions expended in the purchase and application of manures, whose presence, in most instances, for want of water, was a curse, rather than a benefit to our crops. How vitally important, then, the consideration of all causes that are calculated to diminish actual rain-fall, or to interfere with its regular recurrence, or to dissipate its effect.

DROUGHTS MORE FREQUENT THAN FORMERLY.

In discussing the subject assigned me, should I be able, at the outset, to establish the fact that droughts occur oftener, and are severer than they were formerly, I shall feel that I have not only made strong presumptive argument that the actual rain-fall has diminished, but that I have conclusively proven that the change is attributable to the destruction of forests, for which I expect to show that no other material change has occurred in the physical features of the country.

I commence, then, by saying that it is a matter of general opinion, admitted by the most ignorant negro tenant, as well as by the most scientific agriculturist, that droughts are more prevalent. The continually decreasing yield per acre, notwithstanding increased facilities for the manufacture and application of manures, argues the presence of increasing droughts, for defects in labor and scarcity of laborers, by causing concentration upon our better lands, would rather tend to augment than decrease comparative statistics. The frequent entire failure of corn, wheat, and oats, in sections that were once proverbial for the success of these crops, is another item in the count; but I propose to adduce some personal observations, which, I think, establishes the fact beyond possibility of doubt.

DISAPPEARANCE OF CERTAIN SPECIES OF TREES.

Twenty to twenty-five years ago, in my own county, were to be found quantities of chestnut trees, constituting, in some sections, the principal growth of the forests, and were places of resort, by persons in search of the nuts.

These trees have disappeared entirely. I do not recollect of having seen a living specimen within ten years, although the ground is still strewn with their prostrate, though indestructible trunks; eloquent, yet silent witnesses that the laws regulating nature's economy, have here been tampered with. These trees, with the chinquapin, which has largely shared the fate of its more stately congener, inhabit, principally, thin gravelly ridges, whose soil, after clearing and cultivation, is peculiarly sensitive to drought. Again, the Spanish oak, which, like the above, seems to prefer thin ridges, and the red oak, where it is confined to the hills, have, within the last decade, shown so large an increase in mortality, that many predict their disappearance from the catalogue of our forest trees, whilst the hardier species are not exempt in years of severer drought. In fact, the mortality among oaks of all kinds, during these years of drought, since the war, especially in 1871, which was the driest year ever encountered in my State, was fearful, though mainly confined to the hills.

A friend, and a planter of close observation, informs me that he has, during two different years, noted that smaller sized oaks upon which the leaves had actually been parched by drought, after remaining apparently dead for some time, again renewed their foliage with the re-appearance of showers. Here then is food for reflection worthy the most astute philosopher, and yet, in my opinion, not beyond the ken of the intelligent laborer who walks between the plough handles. There must be a cause for every effect produced, and we must look it up in this instance, and bestir us for a remedy, or we shall continue to note the waning resources of the agriculturists of our country.

It will not serve our purpose to say that these trees, like superannuated and diseased members of the animal kingdom, have lived out there allotted time; for, with this solution, only the older chestnuts would have perished, and the destruction of oaks been more general, whereas, it has amounted to extermination in the one instance, whilst the mortality in the other was principally confined to hills, rarely extending to the more moist valleys. Nor do we explain it by admitting the fact that trees like crops upon thin hills are more liable to the influence of dry weather, than are those in a more generous soil, for with this view it must appear to you strange that after having flourished there for ages they now succumb to drought. I don't wish to be understood as advancing the idea that crops upon thin hills are more liable to drought than those in richer valleys, solely because of the superior fertility of the soil of the latter, for, by application of manure, hills are frequently richer in all the chemical elements of the plant; and yet how rare is it, except in the most seasonable years, that they can compare at all favorably with the more luxuriant yield of the valley.

WHY CROPS ARE BEST IN VALLEYS.

I claim, then, the following deductions: Valleys are mainly superior to hills by virtue of advantages of location, which enable them to collect and retain moisture. And when trees or crops succumb to drought upon hills and are luxuriant in valleys, their destruction in the one instance is attributable solely to the absence of moisture, while their preservation in the other can alone be accounted for by its presence. Hence the death of trees upon hills where they have flourished for centuries must establish the fact that there is now deficiency in moisture, or more drought, which has so increased that, in addition to the consumption of crops, they now attack the more assailable portion of the woods themselves.

DESTRUCTION OF FORESTS IN THE SOUTH.

Droughts then have increased, and it is not necessary to show that there has been an actual diminution in the altitude of the rain gauge before we argue the disastrous effects of the destruction of forests. Nor is it required of me that I shall descant upon the electrical influence upon clouds of tall trees upon eminences; or of forests and their climatic influences; or of woods as barriers to wind; or of their properties as condensers of moisture.

These, gentlemen, under the manipulations of a man of science, would be highly interesting, and could all be made to bear an important part in this grand discussion. They are, unfortunately, above the scope of my plantation sphere, beyond which, human vanity shall not tempt me, even upon so important an occasion. But, if I shall be able to show that cleared fields promote general surface evaporation, and facilitate the escape of rainfall, while forests act in the opposite direction, I shall feel that I have pointed out the real cause for these more frequently recurring calamities. For in all parts of the country is visible the wanton destruction of these, Nature's fairest ornaments. Especially is the case at the South, where countless thousands of acres of the finest timber in the world have been felled at the imperious mandate of "King Cotton," to furnish remunerative labor for him of "Afric's sunny plains," whose costly services in his former capacity I fear will not now be compensated for by his recent transfer from the field to the forum. To so disastrous an extent has this clearing been pushed, that many plantations find difficulty in procuring timber for fencing. And this, with its accompanying effects, is the only change visible in the physical features of the general landscape.

HOW FORESTS RETAIN MOISTURE.

Whatever then adds to the general moisture of a country, promotes facilities for rain; because if the atmosphere at a certain temperature is charged with vapor which is moisture, it will be precipitated either in dew, rain, snow, or sleet so soon as this temperature, is lowered whilst if the moisture be added to, and there be no lowering of temperature, precipitation must result from supersaturation. Hence it is pertinent to inquire into the properties of woods as retainers of water and as developers of vapor. We are fortunate in having some most marked illustrations of the power of forests as absorbents and retainers of rain-fall. Select for yourselves some cultivated field of any area which discharges its superflux of rain-fall through a single valley; then take an equal extent of woods of similar topography, and after some considerable rain-fall note the difference in the discharge of waste water from the two outlets, and you will find that the field loses not less than eight or ten times more than runs from the woods. This is not only plantation observation by all of you, but it is borne out by reasoning. The soil in the woods is more porous. The litter upon the surface obstructs the flow of water. The roots, by their deep penetration, make openings, thereby storing large supplies in the lower strata, which are never again reached after clearing, except during the prevalence of very long spells of wet weather. Whilst in the more northern sections the snows are retarded in melting, and are, consequently, more largely absorbed by the hills and mountains for the summer supply of wells, springs, and streams.

THE WATER EVAPORATED BY THE LEAVES, AND WHERE IT COMES FROM.

In looking up some authority upon the subject of exhalation of moisture through the leaves of trees, I was amazed in reading a most masterly effort in which this subject was treated of by F. Ebener, of Baltimore, to find that by actual experiment the annual evaporation from an ordinary sized peach tree amounted to eighteen barrels, or over two gallons in twenty-four hours, and he goes on to say, " that if we consider the size of trees in a well set forest, even of moderate extent, we may see that the yearly evaporation is something enormous. The more and greater the leaves, the greater the quantity of water evaporated."

It must be borne in mind that this immense quantity of water is not of the surface supply, but is principally drawn up from a depth even of twenty feet, in some instances, and which, if not so used would all have percolated the earth and been discharged at the foot of hills to have made its way to the sea, or, in the first instance, would have washed rapidly from the country, had not the woods been there for the arresting and storing up of its volume.

And this is the reason why streams having their sources in timbered sections, are more constant in the supply, and have clearer waters. Whilst those rising where fields have taken the place of forests are characterized by diminished volume, by muddy waters, and by higher freshets.

ILLUSTRATIVE FACTS.

Forests then are, unquestionably, retainers of water and promoters of general moisture; nor do we lack authority for saying that they increase or diminish the annual altitude of the rain gauge, according as they exist, or are wanting.

We are told that in the immense forests along the Orinoco, the rains are disastrously heavy and continuous. On the road to Panama, southward of the Bay of Capica, to the Provinces of Choco and Esmerelda, we meet with impenetrable forests, traversed with innumerable streams and rivers; the popular saying is correct, that there is no day without rain in Choco.

In upper Egypt, before the expedition of Napoleon in 1799, it used to rain occasionally and heavily. The French and Arabs cut down the trees, and ever since rains are of extreme rarity. In lower Egypt, in Cairo, it formerly rained only *once* in two or three years, but the Pasha Mehemet Ali having had some millions of trees planted, there are now some rainy days in every year. On the contrary, towards Payta, where the rocky and sandy soil allows but a sparse vegetation, rain is almost a wonder, and at the time of Boussingalt there had been no rain for seventeen years. In the whole country from Lachan to Lima, rain is as scarce as trees. In France, in the District of Lebocage in Vendee, while the forests were yet untouched there was a superfluity of moisture in meadows and fields, and the roads were never dry. In 1808, the entire extirpation of woods began, and now rain seldom falls. The fields are baked and hard in summer, the grass upon the meadow is poor, and the roads are dry and dusty. These facts, collated by the author of the article alluded to, are all corroborated by the accounts from the prairies of Texas and the West in our own country. In the Smithsonian Report in 1869, in an article from the French, there is an account of the Euphrates which, although rendered for the purpose of showing the diminished volume of streams after destruction of forests, so clearly shows their decreasing influence upon the rain-fall proper, that I will add to it what I consider already an ample list of satisfactory testimony.

He says that Strabo informs us that it was necessary to take great precautions to prevent the country of Babylonia from being submerged. The Euphrates, which begins to swell at the close of spring, when the snows melt on the mountains of Armenia, overflows at the beginning of summer, and would necessarily form vast accumulations of water on the cultivated lands, were not the superflux turned aside by means of trenches and canals.

This state of things exists no longer. M. Oppert, who some years ago travelled through Babylonia, reports that the volume of water conveyed by the Euphrates is much less than in past ages; that inundations no longer occur; that the canals are dry, the marshes exhausted by the great heats of summer, and that the country has ceased to be insalubrious. This retreat of waters, says he, in conclusion, can only be attributed, as he found means to satisfy himself, to the clearing away of the forests on the mountains of Armenia.

Now, these forests not being present to retard the melting of the snow in the first instance, nor to obstruct and absorb the torrents in their descent to the river, it should, of course, show higer freshets occasionally, not only because of the greater amount of water thrown in suddenly, but also by reason of the filling up of the bed by the mud and sands brought down by them. Therefore, a decrease in the altitude of the freshets must be attributed to a failure of rain-fall at its sources, caused by the clearing of forests.

THE FORESTS AS STORE-HOUSES OF MOISTURE.

Forests are promoters of general moisture by maintaining the constancy of streams, which, in their passage to the sea, serve as canals of irrigation not only to the lands lying along their courses, but by supplying the atmosphere with moisture, increase the precipitation of dews for some distance upon the hills.

The usefulness of woods in storing up waters having been demonstrated, I see no objection to considering them the sources of springs; for there is not a cotton-field negro at the South, whether he has occupied a seat in the Legislature or not, who does not know that springs are ruined by clearing away contiguous forests. Springs are the sources of brooks; brooks of creeks; creeks of rivers. The clearing away of forests, then, must affect in the most direct way the supply of these exceedingly numerous canals, which so much mitigate the severity of drought, as is amply shown by the heavy fogs and immense deposits of dews that are so often seen along their courses, as well as by the more luxuriant appearance of crops and general vegetation.

If authorities were needed here, I could adduce more than could be given to prove any other proposition in this article; but as I have in my mind's eye a small creek near me, upon which I have hunted and fished for twenty years, and have noted the diminution of its waters as the forests were felled around its sources, and have, with others, remarked the reëstablishing of its volume since these lands were restocked with pines and old field plums, I shall not now draw upon foreign countries, but dismiss the subject with this single plantation illustration.

INCREASE IN THE ALTITUDE OF FRESHETS.

It is also true that the clearing of forests increases the altitude of freshets. This results, as before noted, from two causes, and is matter of observation certainly with all who have noted the streams of the South. I will give only one illustration of this, although there are very many at my command. Wateree Creek, a stream of my own county, and of sufficient magnitude to change the name of the Catawba into that of Wateree River after its junction. Thirty to forty years ago the clear fresh waters of this creek teemed with the finest fish, and were never failing. It is now ordinarily a muddy and insignificant stream, without even the presence of the little minnow, being frequently dry for weeks at a time; so dry that a friend, who plants upon its banks, probably ten miles from its source, informs me that he saw, during the summer of 1866, morning glories, which had sprung up in its bed, wither and die for want of water. And yet at this point, after heavy rains, it not unfrequently shows a depth of twenty feet in the channel, whilst its rushing waters are spread from hill to hill, devastating crops and sweeping away acres of the finest planting lands of the country, which happening along the thousands of valleys that intersect the South, has added millions of bushels of breadstuffs to our annual importations, for it was upon the superior moisture of the lowlands that the country has been dependent certainly for its superior grain crops for many years past. It is not necessary to pursue the subject further. It was enough to have shown that drought was upon the increase; that forests were calculated to mitigate its severity, and that there had been great destruction of them.

This, whatever might be the indications of the pluviometer in isolated places, would authorize the assertion that, so far as agriculture was affected, there had been virtually, if not actually, a diminution in its annual altitude. It will not do to assert the contrary, because certain localities maintain or even increase in the amount of rain-fall. There is nothing more common than what are known as lucky places for rain. In all parts are plantations, even, which have rains that do not extend often beyond the line fences upon either side, and it is most remarkable that the geographical limits of these showers are not materially varied for years, except during the prevalence of general rains.

It was Sir John Herschel who noted the fact that beneath tall fir trees, when the clouds were low, he was subjected to copious showers, which ceased immediately when he removed beyond the limits of their foliage. Here, then, is a solemn warning that each tree that is felled is so much taken from the wealth of the country. Continue this general disboscation, and soon the simoom of a new Sahara will sweep the bosom of these fair fields.

HORTICULTURE IN PENNSYLVANIA.

By Josiah Hoopes, Pomologist, Pennsylvania State Board Agriculture, and President Pennsylvania Fruit Growers' Society.

It has been suggested that this department of the State Board of Agriculture should, at once, prepare lists of fruits, &c., suited to the various sections of our Commonwealth ; but, in the absence of any definite knowledge on so important a subject, it has been deemed more advisable to postpone such a step for the present.

There is no one feature of our pursuit so imperfectly understood by the great mass of our people, as that relating to a proper selection of varieties, of either fruit or ornamental trees and plants. What will succeed well in one locality, may prove worthless in another, but a short distance away, although upon similar soils and aspects. Such instances are not very frequent.

Soils exert a wonderful influence upon vegetation. The strawberry, that delights in a stiff clay, should not be planted in a light, sandy loam, and so it is with the larger fruits, as well. The best advice that can possibly be given to a novice in horticulture, is to first ascertain what fruits succeed best in his particular neighborhood, and make these the basis of his orchard, adding, as inclination dictates, a few others, by way of experiment. Our works on fruit, while they describe, in accurate language, all the qualities of an apple or pear, it must be remembered these descriptions are taken from specimens, grown, as a rule, under the most favorable circumstances. Perhaps no State in the Union has produced more first-class varieties of fruit than has Pennsylvania, and it is a pretty safe guide to the inexperienced planter to select these for trial, at least.

The Smith's Cider, Fallawater, Smoke-house, Jeffries, York Imperial, and Krouser, among apples; and the Seckel, Tyson, Ott, Brandywine, Kingsessing, Rutter, Reading, &c., among pears, are staple varieties, in certain localities, all over the country. In almost every kind of fruit. both large and small, there are certain varieties that seem to do well, without much regard to soil, locality, or exposure. As illustrations, we have but to allude to the Smith's Cider apple, (for profit,) Bartlett pear, Damson plum, Crawford's peaches, Early Richmond cherry, Wilson's Albany strawberry, Concord grape, &c., &c.

In our State, with a temperate climate, the aspect of the orchard has but little to do with its success. Two of the finest orchards in Eastern Pennsylvania, are diametrically opposed in regard to exposure, one being located on a southern slope, and the other upon a northern one, and yet no perceptible difference can be observed, either in the growth and health of the trees, nor in the yield of fruit. In the West and North, however, the proper aspect of an orchard is a matter of considerable moment.

Draining, with us, in connection witn orcharding, does not pay; at least many of our foremost fruit-growers, after careful experience so declare. The man who selects, as a suitable site for an orchard, a low, wet piece of ground, deserves to fail, and a high, naturally drained loam, with an open, porous sub-soil, such as may be found all over the State, needs nothing more than the application of proper fertilizers, in after years.

In regard to the care of an orchard, our best authorities differ widely in judgment, although, in a thorough preparation of the ground, they mainly agree. The oft repeated advice, to dig but one hole for all the trees, or to speak more plainly, thoroughly pulverize the soil to a considerable depth, is the key-note to the whole operation. If the ground selected for an orchard should be plowed well in the autumn, and top-dressed with manure, at the same time, to be followed the succeeding spring by a similar stirring, as deeply as possible, the young trees will quickly obtain a foothold. There cannot be any question as to the good effects of constant cultivation, during the orchard's earlier years, but as the trees arrive at a bearing age, and the roots extend some distance into the surrounding soil, cultivation, by means of a plough or harrow, is decidedly injurious to the young and tender rootlets, which are the vital organs necessary to the tree's health and vigor.

That justice has not been done to the system of seeding orchards down to grass, almost any inquiring and unbiased mind may perceive, when the opponents of this theory persistently call it the "non-cultivation" system. As explained by Professor Meehan, several years since, this theory is the perfection of high cultivation. As it consists in applying plant food *on* the surface, annually, just where the feeding roots can naturally obtain the benefit of it, without recklessly cutting off, with plowshares and harrow-teeth, these necessary organs, the above name, applied in derision, is without foundation. The grass and clover, when mowed off and allowed to lay as a mulch to the surface, acts beneficially to the trees, by keeping the soil moist and cool, a desideratum of the greatest advantage. That many of our fruit-growers are opposed to this system, after a successful practice of many years with the reverse method, there cannot be any doubt, but the important question to be decided is whether such a course can universally be adopted, without prematurely injuring the trees. The weight of proof so far, in Pennsylvania, at least, is in favor of the so-called "Meehan theory."

Many of our farmers during the planting operation, are especially careful not to tread the soil firm over the roots, but they could not well make a greater mistake. Indeed the best results have been noticed when the earth has been tightly rammed. It is a good rule to observe, that every root and small rootlet should be placed in a natural position, precisely as it was before removal, and then work the fine soil, with the hand, into every interstice. It may be said that every one is fully aware of these facts, but the great trouble is, that every one will not practice them. A little precaution during planting frequently saves partial, if not entire failure in a young orchard.

When out of the ground, roots should never become dry. In the case of evergreen trees, roots thus dried, suffer greatly, and should the trees not be killed, they will at least be badly injured.

A careful planter will provide himself with some ample covering, such as old carpet, in which to envelope the roots the moment they are taken out of the soil. A thorough sprinkling is also very beneficial, and the covering if moistened well retains the dampness. It is perhaps needless to add, that every mutilated root should be carefully cut away, as such invariably decay, and promote disease in other portions of the structure.

It is a difficult task to say what shall be the exact method to pursue in pruning an orchard. Either extreme is equally injudicious, and should be avoided. It is necessary to trim the young shoots when the tree is small, for the purpose of starting a proper outline; if left until the branches become large, the risk of injury is always great. Trees in an orchard should branch low; of this there can be but little doubt, as every feasible theory points to the advantages to be derived from such a course. Shading the surface of the soil, as well as the main body of the tree, is one of the most valuable of these. The fruit is also much more readily gathered from a low branched tree than from an old fashioned specimen, with a body several feet in height. There are yet amongst us many farmers who cling to the prejudice of their ancestors in this matter, believing that the soil should yield a crop of fruit as well as grass, and that for purposes of grazing, the lower branches of the trees should be removed, but this is a decided mistake.

In regard to the great advantages to be derived from a bountiful crop of fruit, there can be but a single opinion, and the only question for us to answer is, can it be grown successfully in our State?

We have our failures it is true, as have all the other States, but we doubt whether Pennsylvania is very far behind the so called favored districts of the country; we have every possible variation of soil and situation within our borders, and it would be strange indeed, could we not select suitable localities for producing as bountiful crops of good fruit, as any other of the older settled districts. It is a well authenticated fact, that newly settled countries are more successful in producing regular crops of perfect fruits than those which date back a century or more, but the insects and diseases which appear to follow in the footsteps of the orchardist will assuredly show no favors in due course of time. Many of these discouraging diseases and injurious insects disappear as mysteriously as they arrive, but they yield to proper remedies, and allow the gardener to enjoy the fruits of his labor.

The man who sits down discouraged, trusting to "luck," will never succeed in fruit growing; it is to the intelligent, industrious, and enthusiastic cultivator, that we must look for our crops. It is true that Pennsylvania cannot boast of so many leaders in pomology as can some of her sister States, but that she has many such residing within her borders we well know; the result of their labor speaks volumes for their ability to teach, were they so inclined.

To these this department extends a cordial invitation to assist it in the future.

In the eastern portion of our territory, the study of ornamented gardening is fully up to the average of other States; but even here, landscape effects are not sufficiently sought after.

It is an art that cannot be wholly learned from books, but belongs as fully to an artistic eye as the most finished painting or piece of sculpture. True one's ideas may be good in the general planting, but without careful study and long experience, he can never produce perfection in his plan, no more than a novice can superintend the building of his modern residence, without the services of a competent architect. We do not desire to discourage any one from ornamenting the surroundings of his home, be it ever so humble, but there is frequently so little true taste displayed in this important part of gardening that an allusion to it may not be amiss. Although deemed of trivial importance by many of our farmers, it is not only a judicious expenditure of capital, but it introduces a feeling of refinement unobtainable by any other system. The rising generation should have their love of home associated with the most beautiful natural objects, and in after years, no matter where their lots shall be cast, a warmer love for the country, and the particular spot where they learned the rudiments of their calling, will be the result.

EPIZOOTIC PLEURO-PNEUMONIA.

BY CHARLES B. MICHENER, VETERINARY SURGEON, PENNSYLVANIA STATE BOARD AGRICULTURE.

GENTLEMEN: The only excuse I have to offer for selecting epizootic pleuro-pneumonia from the long list of zymotic diseases as the subject of this present essay, must be found in the fact that this malady has existed more extensively, and caused greater destruction to our herds than almost any other. Added to this, its *long incubative stage* renders us particularly liable to be visited by fresh outbreaks at each importation from infected countries.

SYNONYMS.

Pleuro-pneumonia epizootica has various names applied to it throughout the different parts of the United States. Among the most prominent are: Lung plague, cattle disease, lung complaint, pulmonary murrain, and lung fever.

NATURE.

It is a highly infectious disease, peculiar to the ox tribe, and shows no preference whatever for age, condition, or breed of cattle, nor for season, climate, or nature of soil. It is generally considered a malignant fever, having local manifestations, which are extensive exudations of an inflammatory character, confined to the lungs and organs contained within the thorax.

PERIOD OF INCUBATION.

Like other zymotic diseases, there is in this an incubative stage, which varies from two to six weeks. As a rule, the local manifestations appear at about the fortieth day. Some have asserted that six months may elapse before the disease is developed.

DETECTION.

In order to detect the affection during its incubative stage, it is necessary for one to be entirely acquainted with the habits of healthy animals, to be a close and careful observer, and, besides this, to possess a thorough knowledge of auscultation, viz: A careful study and comparison of the various sounds that are manifest during respiration, both in health and disease. By the aid of the thermometer, an elevation of temperature is invariably found to precede the attack for some days. This instrument is of paramount importance in all contagious diseases of cattle, as it enables the attending veterinarian to single out those undergoing an incubative stage, and thus limit the spread of contagion. No examination of suspected animals can be perfect without the aid of the thermometer.

HISTORY.

So far as can be ascertained, pleuro-pneumonia has its spontaneous origin in Holland, in Europe, and from there, in 1714, it was introduced into England. In 1747, the disease was carried from Holland, through Bordeaux, to the south of France. We hear of it in this country as early as 1843. In 1847, the lung plague broke out in the herd of Thomas Richardson, of New Jersey. He first discovered it among his imported stock, and before other herds were exposed, knowing the malignant type of the disease, he immediately killed his whole stock, valued at ten thousand dollars, a most noble act. In the summer of 1853, (six years before it appeared in Massachusetts,) J. L. Jacobus bought twenty cattle in New York, which he turned into pasture three miles from Chatham, New Jersey. In about three weeks after, in going to look after them, two had died, and three more were sick. The remaining fifteen did not develop the disease, but during the same fall Doctor Mum, of Chatham, bought three head from this apparently healthy lot of cattle, yarding them with his other stock; not long after which, however, the disease made its appearance among some of his other cows, four of which soon died; several others took the disease but recovered. From Doctor Mum's herd it was communicated to that of Mr. Lunn, by driving a cow there, where she remained for a short time. Abraham Johnson, living within a mile of Newark, New Jersey, also bought some cattle in New York, which developed the disease in about six weeks after he brought them to his farm. It was on this farm, in 1860, that we have an account of the first scientific *post-mortem* examination, held in this country, conducted by C. C. Gryee, V. S., in presence of Doctors G. A. Quimby and Woodruff, of Morristown, and Doctors Ward and Peck, of Newark, Governor Olden, and several others.

Doctor Jennings says that it made its advent into Gloucester and Camden counties, New Jersey, in 1859, at about the same time that it did in Massachusetts. In 1860 it prevailed in Philadelphia, and spread rapidly in all directions, particularly in the southern part of the county, known as the neck. At Riverton, in 1860, Doctor Jennings held a *post-mortem* examination in the presence of C. Wood, V. S., of Boston, and A. S. Copeman, V. S., of Utica, New York. The latter gentleman was one of a committee appointed by the New York Agricultural Society, for the purpose of investigating the disease. Both of these gentlemen had witnessed the disease in all its forms as it appeared in Massachusetts. They were the first to identify the complaint in the vicinity of Philadelphia as the

the same epizootic pleuro-pneumonia, then existing in Massachusetts. In the spring of 1861, J. E. Hancock, of Burlington, N. J., bought some cattle in Philadelphia, which introduced the disease into his herd, and from which it spread to W. Hancock's, A. Gaskill's, T. Lippincott's, Widow Lippincott's, Mr. Clenninger's, and Mr. Smith's. From Philadelphia it worked its way up the Schuylkill into Montgomery county. In the fall of 1865, some cattle purchased in Philadelphia were brought into the vicinity of Newtown, Bucks county, and infected a herd there. One out of that number was brought to Carversville, and broke out with the disease badly, but finally recovered, and, being early isolated, did not spread the disease to any others. In the summer of 1867, pleuro-pneumonia was introduced pretty extensively into the following townships of Bucks county, viz: Buckingham, Solebury, Plumstead, Tinicum, Bedminster, Doylestown, New Britain, Newtown, Morrisville borough, Falls, Bristol, Middletown, Upper and Lower Makefield, Wrightstown, Northampton, and others. We have an account of the *direct importation* of this disease in that of Mr. Chenery, of Belmont, Massachusetts, who imported some cattle on the 23d of May, 1859, from Holland. One of these cows died of pleuro-pneumonia on the 31st of May, eight days after landing. On the 2d of June, a second died; and on the 31st of June, a third died. In June, 1859, Mr. Chenery sold three grade Dutch calves to C. Stoddard, of North Brookfield, one of which showed symptoms of the disease before he got them home. In November, of the same year, C. Stoddard sold eleven of his herd in different directions, which spread the contagion with fearful rapidity wherever they went. The remainder of his cattle he distributed among his friends, not knowing the nature and infectious character of the disease, and without a *single failure* the malady followed them. In one instance, more than *two hundred* cattle became infected by *one*, which was sold at this sale. From this starting point the disease spread to Vermont, New Hampshire, New York, Ohio, and Michigan. Epizootic pleuro-pneumonia was introduced in South Africa about 1854, by the importation of a bull from Holland.

Etiology.

Before going on to enumerate the causes of this disease, I wish to fully establish the fact in your minds that there are *two distinct forms of pleuro-pneumonia*, namely: *Simple*, or *Sporadic pleuro-pneumonia*, which has been known in the United States, and everywhere else, from the time that the diseases of cattle were first made a study; and the *epizootic pleuro-pneumonia*, which made its first appearance on this continent in 1843. The symptoms and nature of these two forms of pleuro-pneumonia are so widely different that there is no excuse whatever for the veterinarian who confounds them. Sporadic pleuro-pneumonia is caused by those agencies which usually give rise to pulmonary affections, such as—climate, temperature, exposure, ill ventilation, bad drainage, bad management, like driving cattle until heated, then standing in a current of air, or drinking large quantities of cold water, &c., &c. But that form of the disease now most particularly under consideration *never has*, nor *never can* originate from the causes above given. It has its origin solely from a *specific* poison, which is developed spontaneously, so far as we know, only in Holland and the interior of Europe, and is carried to all other countries by infection. This poison, whatever its nature may be, will, under all circumstances, where it finds a subject susceptible to its influence, produce the same specific, epizootic pleuro-pneumonia. The virus is propagated and conveyed to others through the vitiated atmosphere which diseased cattle have been breathing, by the diseased products of the body, and by the hay, or litter, &c., which have been used about the sick animal.

SYMPTOMS.

During the period of incubation, or hatching, the animal improves in condition, and the flow of milk is increased. This is due, no doubt, to the influence of the poison upon the blood and nerve centers. The first stage of the disease is marked by an elevation of temperature, often registering as high as 103 to 104 degrees Fahrenheit. In the morning the animal will be seen standing by itself, refusing to eat, back arched, respiration disturbed, and some abnormal sounds heard in the bronchial tubes; pulse rapid, shivering, dry, husky cough; mouth hot, muzzle dry. Some show a disposition to eat, and appear better about the middle of the day, but this is by no means a constant symptom.

SECOND STAGE.

All the foregoing symptoms aggravated—milk decreased, mouth hot, breath tainted, mucous membranes injected, bowels constipated, urine scanty, surface of body and legs cold, shivering fits, respiration more hurried and painful, coat stares, skin dry and scurvy; the pulse is rapid and full, numbering 80 to 90 beats per minute; the head and neck are extended, and a low grunt or moan follows every expiration.

THIRD STAGE.

In this stage the cough is more frequent, hard, and persistent; the limpid discharge from eyes and nostrils becomes purulent, bowels still constipated, skin is bound tight to the tissues beneath, pressure behind the elbows and on the back causes great pain, and a low moan is uttered, large amount of saliva or froth escapes from the mouth; the pulse is now weak, irregular, or intermittent, diarrhœa sometimes sets in, membranes become pallid, eyes sunken, animal heat exceedingly low; these typhoid symptoms are the indications of a rapid death.

PHYSICAL SYMPTOMS.

By placing your ear at the bottom of the neck, a loud, rushing sound of air is heard in the trachæ and bronchial tubes. The same sounds are heard at the top and sides of the chest, just behind the shoulder blade. Below and back of these parts no sound at all is heard, showing that the lungs are consolidated by the fibrous exudations which are being constantly thrown out. At the commencement of an attack we can often notice what is called the "friction sound," from the rubbing together of the thickened and rough membranes during respiration. Should one lung only be affected, the respiratory murmur in the healthy lung is much increased, in consequence of its having to perform double duty. When both lungs are diseased, we expect peculiar effects and sounds, according to the intensity and extent of the lesions. There is increased resonance on percussing the healthy lung, while over the diseased part a dull, heavy sound is elicited

MORTALITY.

Writers differ very much about the percentage of deaths from pleuro-pneumonia epizootica. According to M. Lecog, of France, only seventeen per cent. die. The testimony given by Dr. Martin, before the Massachusetts Legislature, fixed the per cent. of deaths at about twenty-eight, while the loss in Bucks county amounted to near forty per cent.

POST-MORTEM APPEARANCES.

On exposing the thoracic viscera, one of the first indications of epizootic pleuro-pneumonia is the escape of large quantities of fluid from the cavity. This fluid mostly contains large patches of yellow, plastic, or coaguable lymph floating about in it. As a result of the inflammation which has been going on, we find that this plastic lymph has fastened the lungs to the ribs, and formed what we know as "false membranes," or "adventitious tissue." These false membranes are sometimes fastened to the diaphragm and heart, as well as the sides of the chest. The lungs are found to be exceedingly heavy, often weighing from fifty to seventy-five, and even one hundred pounds, sink in water, and instead of the bright salmon color of health, we observe a dirty, gray color, mottled, and having the appearance of marble. The surfaces are rough and thickened, and the lung substance hard and firm. The bronchial tubes are frequently found entirely blocked up with fibrinous deposits, thus shutting off the contact of air with the blood, and producing death by suffocation.

This exclusion of the atmospheric air from the lungs accounts for the dark, purplish color of the transuded blood corpuscles and fibrinous exudations. In some of the more advanced cases, abscesses are found in the substance of the lungs, which either discharge through the bronchial tubes, undergo degeneration, (the *amyloid*, most frequently,) or else the discharge takes place within the chest, which gives rise to the *amphoric rale.* All the other organs of the body are (as a rule) found to be in a state of health.

TREATMENT.

There can be no special remedies given, with which to treat this disease. The condition of the animal, and other indications for treatment, will be sufficient to point out to the educated veterinarian the best means to apply to each particular case. Medical treatment is, however, often very unsatisfactory, doing little or no good. By the free use of mineral tonics much good may be accomplished, in the way of fortifying the system against infection. But these, even, can only be intelligently and safely administered by a veterinary surgeon.

INOCULATION.

This has been practiced, with questionable success. The method usually pursued, is either to inject some of the serous fluid obtained from the lung, or to tie a piece of the diseased lung on the tail, after having made an incision through the skin. Resulting from this operation, we frequently see the animals lose their tails by gangrene. Large swellings, which open and discharge fœtid matter, appear on the body, and, not unfrequently the animals die from the injurious effects of inoculation. It is estimated that from ten to twenty per cent. of the animals inoculated die of pleuro-pneumonia, while from one to two per cent. die from the evil consequences following the operation.

TERMINATIONS.

Epizootic pleuro-pneumonia terminates first in resolution. In this, the normal functions of the lungs are restored, the products of the inflammatory action are absorbed, the air cells and bronchial tubes are freed of their obstructions, the pulse becomes stronger and less frequent, respiration regular and slower, and the respiratory murmur of health is again heard. The appetite improves, more copious secretion of milk, discharge from nose and eyes ceases, the mouth is cool and muzzle moist. Health seems to be reëstablished. I say *seems* to be restored; for, in almost every case of this kind, we find, on a careful examination, more or less diseased condition of the lungs, which is present in a latent form, but only awaits the *proper stimulus* to make it the nucleus of a contagion, which may infect whole neighborhoods, and bring about all the terrible calamities resultant on such outbreaks. Such cattle should, therefore, be fattened and disposed of to the butcher, as soon as possible, and, in no instance, should they be allowed to herd with other cattle.

Very often an opposite termination is reached. By carefully listening, with the ear applied to the sides of the chest, we detect the presence of water in the thoracic cavity (hydrothorax.) The pulse is now weak and intermitting, and the obstruction to the circulation is evident in the production of the venous pulse. The mucous membranes are pale, and dropsical swellings appear on the chest and abdomen. The breathing is difficult, nostrils very widely dilated, and general weakness supervenes. The animal dies, finally, from internal drowning. Death is frequently hurried by sudden distentions of the rumen with gas, as a result of the arrest of digestion. Again we find it terminating in a slow, typhoid, hectic fever, in which obstinate diarrhœas ensue, and death follows from actual consumption.

MEANS OF PREVENTION.

Legislation in reference to cattle diseases, with the assistance of veterinary science, is calculated to do a vast amount of good to our country. The first step to be taken in preventing the spread of this disease is to have all the stock which have been exposed to the influence of this poison entirely isolated from all other cattle. Do not allow the person who has charge of the infected stock to handle or be about others. Keep the buckets, &c., separate, and do not under any circumstances feed the hay to well animals which has been refused and breathed on by the sick. Have the barn which is occupied by the sick animals thoroughly ventilated; keep their stalls clean, and use disinfectants and deodorizers freely about the floors and mangers. Cattle once infected should not be kept for any purpose, but should remain apart from all others until fat enough to kill, and be disposed of in this manner. The whole history of epizootic pleuro-pneumonia, as it has appeared in this country, clearly indicates that it is an infectious disease, and also shows that by strict and early isolation an outbreak of it can be stamped out almost as quickly as it was known to appear. Let us remember in dealing with contagious cattle diseases that the acme to be attained is efficient prophylaxis rather than treatment. Professor D. McEachran, the very able principal of the Montreal Veterinary College, says: "When we consider the enormous wealth represented by live stock in the United States and Canada, (in the former 100,322,600 animals, which, at a moderate valuation, amount to the vast sum of $1,647,719,138, in the latter 7,982,355, equal to $133,866,567,) we will be able in some measure to comprehend the great responsibility resting on the governments of these countries. Now that we are so remarkably free from these contagious diseases, let us take active measures to prevent their introduction into our midst. I am convinced that we have it in our power to prevent their introduction, not by stopping importation, nor by any oppressive measures calculated to interfere with our commercial intercourse with infected countries, but, by a judicious yet thorough system of quarantine and disinfection at our ports of entry, and with the aid of government and the coöperation of the people I have no doubt but a judicious system which will serve to protect the property of the people, without interfering with our foreign relations, or the liberty of the individual, can be organized and maintained at a very little cost to the State or inconvenience to the public. I will take the liberty of suggesting, that the ports of entry for cattle from trans-atlantic countries be limited to a small number, and that at each of these a quarantine be established where cattle, sheep, and swine must be landed, and kept for a period, say of eight or ten days. That it be not *permissive*, but *imperative*. The arrangements of the quarantine to be such as will allow of the complete separation of all suspected and diseased animals from the healthy, having isolated sheds for each class—the owner of stock to pay for all the food and attendance during the time they remain in quarantine. The only manner by which we can prevent or suppress these foreign contagious diseases from ravishing our herds is for the government to give to the veterinary profession that recognition which a science of such paramount importance deserves. Who are capable of advising government on matters relating to the diseases of stock if not this profession? It is a standing reproach to this great country that so far we have received almost no encouragement at the hands of the government. The government ought certainly to appoint a veterinary department, both civil and military—the former to manage all matters relating to veterinary sanitary measures, that none be appointed to any position as inspectors or veterinary surgeons to regiments except regular graduates of recognized colleges. Each State should have its own consulting veterinary surgeon, paid by the State, who could be consulted and deal at once with any outbreak of disease.

We are liable at any time to have one or more of these epizootic diseases sweep over the whole length and breadth of our continent, and then when every herd and flock bear the sad impress of disease, the *government* and *people* will realize what tremendous risks they have been incurring by not encouraging the growth of a scientific veterinary profession, and by not having competent men at every port of entry to guard against the *introduction* of these fatal infectious diseases. Above all others it is the duty of agricultural societies to do all in their power toward the establishment and support of veterinary colleges; that there may be those among us who can intelligently minister to the wants of animals, both in health and disease. In conclusion, gentlemen, let me impress upon this board the importance of getting the government *alive to the facts* that is necessary for our best interests to adopt *preventive measures* to insure us against the scourge of disease, and that the time has now come when we cease appointing ignorant and unqualified men to fill responsible positions, while there are educated veterinarians among us who who would discharge the duties devolving upon them with credit alike to the government and the veterinary profession.

Let us feel the full force of the maxim that "in times of peace prepare for war," and instead of keeping our ports *invitingly* open, as we are now doing, to the entrance of these diseases, let *active* and *decisive* measures be enacted that we may be saved the lives of thousands of cattle and millions of money.

BOARDS OF AGRICULTURE OF OTHER STATES.

NOTE.—In preparing the following outline of the history of the Boards of Agriculture in other States, the necessity which compels brevity and condensation, will no doubt render the meaning obscure in some cases, and in others the absence of reliable data may have the same effect. This, however, will scarcely affect the main object, which is that our farmers may know what is being done by other States, in the hope that it may stimulate them to render to our own board that aid and indorsement which is absolutely needful for the perfect success which its best friends would have it achieve.

So far as it was possible to obtain access to them, the records of the State Boards and of the National Department of Agriculture have been consulted, and the thanks of this board are due for assistance rendered by the secretaries of the boards whose history is given.

MAINE.

The Maine State Board of Agriculture was organized in 1856. Since then the act of organization has undergone some important changes. The board is now composed of one member from each county, five members at large, appointed by the Governor, and one member each from the State Agricultural Society, State Horticultural Society, and State Poultry Society. The county members are elected by the county agricultural societies, and hold office for three years. In counties having more than one agricultural society, the members are elected by each in regular rotation.

The board holds two public meetings, of four days each, annually, one at the State Agricultural College, and the other at such point as the board may direct. Of the bounty paid by the State to county agricultural societies, the board controls the expenditure of one half. The members are paid their actual expenses while attending the meetings and duties of their appointment; for this purpose one thousand dollars is appropriated. The salary of the secretary is $1,000. Six thousand dollars is annually appropriated, to be used in the payment of bounties to county societies. The State prints 10,000 copies of the annual report of the board, at a cost of eighty cents per volume.

S. L. Boardman, secretary, Augusta.

NEW HAMPSHIRE.

The Board of Agriculture of this State may, probably, lay claim to having been the first of the kind in the United States, having been first organized in 1820. One member from each county society then formed the board, but in a few years these organizations ceased to exist, and although authorized by law, the board, for many years, had no existence as an organization. In 1870, it was again organized by a membership of one from each county, but appointed by the Governor. In 1872, the expenses of the board, including the salary of the secretary, were less than one thousand dollars. The reports, containing about five hundred pages, are printed at the expense of the State.

James O. Adams, secretary, Manchester.

VERMONT.

The Board of Agriculture, Manufactures and Mining of Vermont, was organizsd in 1870, and consists of the Governor of the Commonwealth, the president of the State College, and six members, nominated by the Governor and confirmed by the Senate. The board has an annual appropriation of $2,500, over which they have full control. Its members receive their actual traveling and other expenses, $1 50 for each day spent in the service of the board. The salary of the secretary is fixed by the members of the board. One meeting is held annually in each of the fourteen counties of the State. Formerly the report was biennial, and limited only by the board; now it is annual, and limited to five hundred pages; four thousand copies are printed at a cost of about fifty-nine cents per copy. The total cost of the board is about $4,000 per year.

To this board belongs the credit of inaugurating the plan of holding meetings in various parts of the State, thus taking the work of the board to the farmers.

H. M. Seely, secretary, Middleburg.

MASSACHUSETTS.

The Massachusetts State Board of Agriculture was organized in 1851, and has been in an active condition ever since that date. It is composed of the Governor, Secretary of the Commonwealth, president of the Agricultural College, State Agricultural Chemist, three members appointed by the Governor, and one elected by each county agricultural society which receives a bounty from the State. In 1876, this gave the board a membership of thirty-nine. For the complete work of this board, the State appropriates $39,000, divided as follows: Salary of secretary, $2,500; extra clerk hire, $400; secretary's clerk, $1,200; bounty to county agricultural societies, $18,000; expenses of members, $1,500; postage and incidentals, $400; printing reports, $15,000. This board is a permanent department of State, and is recognized as such. Its reports are well received, and fail to supply the demand.

Charles L. Flint, secretary, Boston.

CONNECTICUT.

The Board of Agriculture of this State was organized in 1866. In 1870, it was abolished by an act of General Assembly, but was reorganized next year, and has since been in successful operation. One annual meeting, of three days' duration, is held for discussions and the reading of essays, &c., and occasional single day sessions, as the board may order. It has four members appointed by the Governor, and eight elected by agricultural societies. For the advancement of agriculture, the State appropriates as follows: State Board of Agriculture, $2,500; printing report, of State Board, $3,750; agricultural experiment station, $2,800; bounties to county agricultural societies, $3,000, and bounty to State Agricultural Society, $2,500. Total, $14,550.

The amount appropriated specially for the State Board of Agriculture, is expended as follows: Secretary's salary, $700; traveling expenses of secretary, $200; postage, &c., $300; expenses of members, $500; lectures and postage on reports, $625, and salaries of other officers, $475. Total $2,500.

The State prints 6,000 copies of the report of the board, costing $3,750, or sixty-two and one half cents per copy. These are distributed as follows: For the Legislature, 1,000 copies; for general distribution, 4,000, and for the board, 1,000.

T. S. Gold, secretary, West Cornwall.

NEW JERSEY.

The membership of the Board of Agriculture of this State, consists of "the president and two of the professors of the State Agricultural College, chosen by the faculty; three members of the board of visitors of the

Agricultural College, chosen by the board; the president or other representative sent by each of the State and county agricultural societies, that may be in correspondence with the board." The board meet at the State capital at least once each year, and as much oftener as is deemed necessary. The members are paid their actual expenses, and the secretary receives a nominal salary, with duties which do not interfere with his duties as professor in Rutger's College.

Professor George H. Cook, secretary, New Brunswick.

OHIO.

The Board of Agriculture of Ohio was organized in 1846, and in addition to other duties, holds an annual fair. The board is composed of ten members, from whom a president is selected. They receive an annual appropriation of $3,600 for "the encouragement of agriculture." The State prints 20,000 copies of their report, at an expense of fifty-five cents per copy. They hold five meetings in each year, two of which are held at the State capital, and the remainder at the time and place of holding the State fair.

John H. Klippart, secretary, Columbus.

INDIANA.

The Indiana State Board of Agriculture is composed of sixteen members, elected by a convention, composed of members of the board and representatives of county agricultural societies. They elect their president and secretary, and hold an annual fair. The board meet twice each year at the State capital, and as much oftener as may be needful. They receive an appropriation of $1,500 from the State, for general purposes, and have published, at the expense of the State, 3,000 copies of their report, costing seventy-five cents each. This year they have received a special appropriation of $15,000.

Alexander Heron, secretary, Indianapolis.

ILLINOIS.

The membership of the Board of Agriculture of this State is made up by one delegate from each of the nineteen representative districts of the State; they elect their own officers, and fill vacancies in the board. They receive an annual appropriation of $3,000 from the State, and hold an annual fair. The State publishes 10,000 copies of their report, at a contract price of fifty cents per copy.

One annual meeting is held at the State capital, special meetings on the call of the president, and adjourned meetings at the option of the board; members' expenses paid, and secretary receives a salary of $2,000.

S. D. Fisher, secretary, Springfield.

KANSAS.

The Kansas State Board of Agriculture is composed of the Governor, Secretary of State, and ten members. In addition to the usual duties of such a board it has charge of the statistical and census duties of the State. Its appropriations are: For salary of secretary, $1,800; clerk hire, $1,200; postage and incidentals, $600; expenses members, $500; botanical department, $200; blanks, printing, &c., $1,200; for printing report of 3,500 copies, $6,000. In addition to this, there is appropriated, and to be used by the board, $1,900, for compiling the census.

The report of the board for 1875, is a model of workmanship and finish, and the display at the Centennial was an evidence of what may be accomplished by an efficient board, even at such a distance from its base of supplies.

Secretary, Alfred Gray, Topeka.

MISSOURI.

The Board of Agriculture consists of the Governor, Superintendent of Public Schools, and twelve members elected by county agricultural societies. In case of a failure of county societies to elect, the board may fill all vacancies. The sum of $4,000 is annually appropriated for the use of the board, to be expended under direction of the board. The annual meeting of the board is held in St. Louis, and the president has power to call such other meetings as may be needed. The expenses of the members are paid from the State appropriation. The size of the report is limited to 500 pages, and the number to 14,000.

John Montieth, secretary, St. Louis.

In addition to these, this board is in correspondence with the Michigan State Board of Agriculture, R. C. Baird, secretary, Lansing; Nebraska State Board of Agriculture, D. H. Wheeler, secretary, Plattsmouth; and also with the Department of Agriculture of North Carolina, L. L. Polk, Commissioner, Raleigh, and with the Department of Agriculture of Tennessee, J. B. Killebrew, Commissioner, Nashville.

OUR POULTRY INTERESTS.

By Dr. A. M. Dickie, Doylestown, Bucks County, Pa.

The dwellers in the cities and towns of the "North Atlantic Slope," have a more intelligent conception of the amount and value of the poultry and eggs produced in the country, than any other people in the United States. Outside of these cities and towns, and the rural districts surrounding them, our people have no correct ideas concerning the importance of the products of our poultry yards.

Poultry-keeping is regarded by the masses as an insignificant business, adapted to, and conducted by, the women-folk and children of the household. This view will have to be modified. There are at present, in different parts of the country, men, and women too, who are paying particular attention to the cultivation of poultry and eggs. This industry is largely developed in New England, and is extending to the Middle States, and what is known as the Lake Region. Thousands of tons of poultry, and incredible numbers of eggs find their way to the markets of the North Atlantic slope, and all find sale at fairly remunerative prices. It would be interesting to examine statistics of this trade, if they existed. They would amaze people who had given the subject no previous attention.

It is a safe estimate to value the annual products of the poultry yards of the nation at $20,000,000. This is an immense sum, and will, probably, stagger the credulity of many who realize what an enormous amount it is. We are in the habit, since the war, of reading and repeating daily large numbers, without comprehending what they mean. Perhaps the majority of people have no more idea of what one hundred millions or two hundred millions are, than they have of infinity or eternity.

I have recently made an attempt to get the statistics of the poultry and egg trade of New York city, but without success, as there are no statistics, and the dealers will not even hazard a guess at the amount of the trade. This seems strange, but it is true. I had the good fortune to secure the interest of Mr. Taber, reporter of the produce markets of New York, for the *Tribune*, in trying to get at the amounts of the poultry and egg trade for the city; but there was no data to go by, and nothing definite could be ascertained concerning it.

In the absence, then, of any figures, we may make estimates of the amounts consumed on the North Atlantic slope. This is, of course, not a satisfactory method of procedure, as estimates, however carefully made, are only estimates, and do not carry much weight. Mr. Taber, in conversation with the largest receiver of live poultry in the city, got his estimates of the amount of live poultry received, which was 2,000 car loads per annum, averaging 7,000 pounds per car, or 7,000 tons in the aggregate. If the proportion of the receipts of live to dressed in New York correspond to those in Philadelphia, the live would be to the dressed as one to nine, making the total receipts of both live and dressed, per annum, 70,000 tons. This is a very reasonable estimate, and under, rather than over, the reality. The average price of poultry in the cities is, say thirteen cents per pound, or $260 per ton, or $18,200,000 in the aggregate, for the year, for one city.

It is well known that the number and value of eggs received in New York is a large amount; but there are no statistics of the trade. The number of packages received daily or weekly may be ascertained, but the number of dozens cannot be known, as packages are of various sizes. Some are large, some small, some medium. Barrels, boxes, and baskets, even, are used as packages in transporting eggs; the baskets by farmers from near by points. These last are not enumerated in the reports.

There are, probably, daily average receipts of 1,200 packages of eggs; suppose, however, there are 1,000, and that the packages will average seventy dozen each. This would give 490,000 dozen per week, or 25,000,000 dozen a year, worth an average of twenty-five cents the dozen, or $6,250,000, as the consumption of one city. This estimate is too low, but we will let it stand, as it shows an amount of trade scarcely realized by the majority of either producers or consumers. This will give an aggregate consumption for New York city alone of about $24,500,000 worth of poultry and eggs annually. Suppose we should multiply these figures by five or six, so as to indicate in an approximate way, the whole consumption on what is known as the North Atlantic slope, and we begin to get some idea of the extent and importance of the "chicken business." It is true that New York, with its million of inhabitants, more or less, probably consumes a larger percentage of poultry products than the average millions of our population. Allowing this to be true, and that the other millions consume one-fourth as much as New York's million, the aggregate would run considerably above the $20,000,000, at which I estimated the whole product of our poultry yards.

These figures and estimates may seem very large, but they are not too large—in fact, they are not large enough to fully represent the production and its market value. I have been an observer of the poultry producing industry of Bucks county for more than a dozen years, and have made some effort to ascertain the amount and value of this product. This county is probably the banner county in the United States in poultry production, Burlington county, New Jersey, being its closest competitor. Bucks county poultry is recognized as superior in the price lists, and is generally quoted higher than that from other sections. It is pretty shrewdly suspected that a good deal of the poultry sold as Bucks county is not genuine.

Whatever reputation Bucks county has gained for its poultry, is deserved. The business is very carefully and systematically conducted. There is no peculiarity in the soil or the location that gives it any advantage over other counties in the south-eastern part of the State for poultry raising. Any superiority that may exist is in the skill and care employed in the pursuit, and the quality is the result of knowing how to conduct poultry-keeping.

Our county contains 605 square miles, or 378,200 acres. There are 5,800 farms enumerated in the county directory. After allowing for roads, forests, and town-sites, twelve per cent. of the whole, the farms so called will average about fifty acres each. This gives a large number of holdings, and although they are small, they are plenty large enough for successful poultry keeping. If almost any of our farmers were asked to name the most important business, in a money point of view, in our county, he would unhesitatingly say dairying, and scarcely a man would gainsay the statement. In one sense such a statement would be correct. But as a source of income, dairying, even in our county, must be subordinate to poultry keeping.

By the census of 1870, there were 28,572 cows in Bucks county, and 2,861,557 pounds of butter made, with no estimate of the milk sent to Philadelphia, which is a large item, say four per cent. of the whole amount produced. If all this butter were of the "gilt-edge" variety, and sold for a dollar a pound, the grand aggregate would be large, or nearly $3,000,000. But while some of the butter is the genuine gilt-edge sort, and sells at a fancy price, we may quote Eastburn Reeder, who must be regarded as good authority, for averaging the price of butter to the producer at thirty-three cents per pound. This would make the total dairy product, not counting the calves, less than one million dollars per annum; including the calves, about one and a quarter millions. This is a respectable income for one county from dairying. But it is equalled or surpassed by several of our neighboring counties.

The hay sold in Bucks county is about equal in value to the dairy products sold. The next most important products sold are fruits and vegetables. All these products are supposed to be of a staple character, and figure in the census reports, and among the statistics of boards of trade, produce exchanges, &c. While there are important products, valuable to the producer, indispensable to the consumer, and promoted to the dignity of figuring conspicuously in census and trade reports, let us see how they compare with the insignificant and unnoticed industry of poultry production. I am not so well acquainted with the poultry business in other counties, and will speak of Bucks only.

To begin then, *the poultry products here are worth more in money than the dairy products, or the hay sold, or the fruits and vegetables sold, or from almost any two of them combined.*

From close and careful estimates the products of our poultry yards are worth $2,000,000 a year. I know many of our farmers will not believe this, but if they will study up the matter, as I have done, their opinions will be very much modified. The fact is, there are not a dozen farmers in the State entitled to express an opinion on this subject, because they have never given it the slightest attention. But many a man who will study the statistics of the coal or iron trade of our State until his head aches, will pooh-pooh statistics of the poultry trade, but they are worth studying, nevertheless.

Large as the sum I have just named is, when it is divided up into numbers corresponding with the number of producers, it amounts to about $275 for each farm, or between $5 and $6 per acre. But besides farmers, thousands of people in our county who own no land, except a house and a small lot of an acre or two, raise large quantities of poultry and eggs. Beyond these many a laborer who rents a cottage by the wayside produces enough poultry and eggs to buy his groceries, and occasionally a pair of small shoes and stockings, a hat, and other small notions for his family. There are at least 8,000 persons engaged, more or less, in raising poultry in Bucks county. While many of them have no great surplus to sell, a large number have considerable quantities to dispose of. When all the eggs sold weekly; the poultry, consisting of fowls, turkeys, geese, ducks, and chickens, are aggregated, the total amounts to a very large figure each year.

There are ten dealers in the eastern side of the county, from Reiglesville south to Yardley, on the Delaware river, who ship poultry and eggs to New York by rail every week. These men all keep an account of the amount they handle, and it is something surprising. Large as it is, however, it comprises but a small part of the whole product. Philadelphia is our principal market, to which thousands of tons of poultry, and immense quantities of eggs are taken.

It will thus be seen that the poultry business is one of prime importance with us, and ranks with many other classes of productive industry which are supposed to be much in advance of it. The business is steadily growing, and in many sections of the State where no attention was formerly paid to it, people are beginning to see their profit in it, and are producing more largely every year. If every county, or every tenth or twentieth county produced as largely as Bucks, the thing would be overdone. But it has taken more than fifty years of experience to attain our present position in poultry raising. Quite likely beginners in other sections will have many things to learn before they know all the ins and outs of the business, or produce largely enough to interfere with the regular course of the trade.

Before the end of our second century we will be the leading manufacturing country in the world. Our cities and towns will grow larger, and prices in our produce and meat markets will not not be largely reduced. We hear complaints now of the high price of meat. The number to be fed is all the time increasing at home, and new outlets for fresh meat are found on the other side of the Atlantic. The importance of poultry as a food supply will be recognized and appreciated in the coming years, and although the production will be largely increased, the consumption will keep pace with it. There is little danger that fine poultry and fresh eggs will ever go begging for a market. I would therefore advise all who have the facilities for poultry raising to study the matter up, and produce as largely as they can, to do it intelligently and profitable. Poultry raising is not a holiday business. There is much to be learned about it, which the general public do not appreciate, but which must be known and practiced before success is possible.

As an article of diet, poultry and eggs are universally acceptable. The only misfortune about it, is their scarcity. The rich can, of course, command them at any time, but other classes enjoy a poultry dinner as a luxury on great or special occasions whenever they can. As food, poultry is wholesome, digestible and nutritious, and is relished by every healthy person. It is supposed to be particularly adapted to the wants of certain classes who are occupied in brain work, or whose business is wearing upon nerve tissue. Among these may be classed literary people, journalists, ministers, teachers, artists, skilled artisans, merchants, &c. These classes will increase among us, and will have to be fed. Our meat markets will in time more resemble those of the French, where poultry is sold in as large quantities as meat of any other kind. We may console ourselves then with the thought that when the price of beef and mutton gets beyond our reach, we may find a substitute in poultry and eggs, and in the future we shall have a market on the other side of the Atlantic for any surplus we may have to spare from our poultry yards.

WEEDS; THEIR GROWTH AND EXTERMINATION.

BY E. MICHENER, M. D., *Author of Manual of Weeds, Toughkenamon, Pa.*

> "I went by the field of the slothful, and by the vineyard of the man void of understanding: and lo! it was all grown over with thorns; nettles had covered the face thereof; and the stone wall was broken down."—*Solomon.*
>
> Let each reader supply the moral: "*I looked upon it and received instruction.*"

In the emphatic language of the late excellent Doctor William Darlington: "The perfection of beauty, in a farm, consists in fertile fields, producing nothing but what is valuable to the proprietor; with enclosures neat and strong, and the very corners of the fences clear of weeds and rubbish."

WHAT, THEN, IS A WEED?

The term weed, as here used, does not apply to any particular plant, or assemblage of plants. In an agricultural sense, all plants become weeds when found growing where they deteriorate other crops, needlessly exhaust the soil, or otherwise inure loss to the owner.

"EVERY PLANT OUT OF PLACE IS A WEED."

Agriculture is a perpetual conflict with aggressive weeds; a conflict which will ever constitute a very material part of the labor necessary to be expended on a well conducted farm. Hence, it is necessary, with a view to economy, as well as to final success, that the labor should be wisely directed. Here, as elsewhere, knowledge is power. A knowledge of the general nature of plants, and of the peculiar habits of the plant to be operated on, is indispensable, to direct the operator how he can best apply the means at his disposal, to the intended purpose.

Weeds may be considered, either:

1. Herbaceous, fructicose, or arborescent;
2. Annual, biennial, or perennial;
3. Rhizomatous, bulbous, or tuberous.

The judicious farmer will find many occasions to refer to these distinctions, in his war of weed extermination. It must afford poor comfort to destroy a weed which is already dying, after it has replenished the soil with seeds for another crop, yet too many seem to forget that seeds produce weeds, and weeds produce seeds.

A large portion of the herbaceous weeds may be successfully destroyed by a judicious use of the plow and other implements of tillage. The more arborescent forms will require the grubber, while the rhizomatous, bulbous, and tuberous rooted ones mostly require different, often opposite treatment. The plow and harrow would only break in pieces and scatter the fragments of their vivacious roots, which are ever ready to grow and develop new plants, as we may have occasion more fully to consider.

When a suspicious plant occurs, the question naturally arises, or should arise, what is this weed? Is it an annual? a biennial? a perennial? At what season does it ripen seed? Has it any other mode of reproducing its kind? and what? What crop does it affect? Are its fragmentary roots vivacious? and capable of producing new plants, when left in the soil? When these, and similar inquiries, have been duly considered, we shall have learned two important lessons:

WHAT TO DO, AND HOW TO DO IT.

Instead of burdening the non-botanical reader with the usual technical descriptions, which can be readily found in the botanies of Doctors Darlington and Gray, I have preferred to arrange the weeds in groups, according to their duration, with a running commentary on the leading characteristics of each group, and the general treatment for their extermination.

NOTE.—Only the more important and obvious weeds are included in these lists. Under cultivation, an annual may become a biennial, or the contrary. Ex. winter and spring wheat.

GROUP NO. I—ANNUALS.

(*Herbaceous.*)

Papaver dubium,	Corn poppy—Field poppy.
Camelina sativa,	False flax—Wild flax.
Capsella bursa-pastoris,	Shepherd's purse.
Lychnis githago,	Cockle—Rose campion.
Portulacca oleracea,	Garden, or common purslane.
Abutilon avicennæ,	Indian mallow—Velvet leaf.
Sida spinosa,	Spinose sida.
Sicyos angulata,	Single-seeded cucumber.
Ambrosia trifida,	Fall, or swamp rag weed.
Ambrosia artimissiæfolia,	Common rag weed—Bitter weed.
Xanthium strumarium,	Cockle bur—Clot bur.
Xanthium spinosum,	Spinose clot bur.
Bidens frondosum,	Bur marigold.
Bidens bi-pinnatum,	Spanish needles.
Manita cotula,	Fœtid chamomile—Dog's fennel.
Sonchus oleraceus,	Sow thistle.
Datura stramonium,	Jamestown weed—Thorn-apple.
Solanum nigrum,	Common night-shade.
Chenopodium album,	Lamb's quarters—Goose foot.
Amaranthus hybridus,	Hybrid amaranthus.
Amaranthus spinosus,	Thorny amaranthus.

Polygonum hydropiper,	Water-pepper—Smart weed.
Euphorbia hypericifolia,	Large spotted spurge.
Cenchrus tribuloides,	Bur-grass—Hedgehog grass.

COMMENTARY.

This list might be greatly extended.

Annual plants, as the name implies, live only one year. They spring up, blossom, perfect their fruit, and die the same season. The young growth, as it comes from the seed, is called a *seedling* plant; when grown, and maturing seed, it is a *seeding* plant; a distinction of vast importance to the cultivator. Destroy the *seedling*, and the work is complete; allow it to become a *seeding* plant, and scarce anything is accomplished by its destruction; its seeds may produce a hundred fold the next year. The labor of early extermination is in an inverse ratio to its advantages. The timely and judicious application of the harrow, or the garden rake, will effect more than the plow and the hoe, after the "golden opportunity" has been lost. Yet, strange as it may seem, farmers and gardeners do very often pursue the latter course.

When the seeds of annual plants are sown late in the autumn, too late to reach maturity, they will sometimes rest over the winter, and mature the next season, forming a sort of *pscudo biennials.*

Special cases will necessarily require special treatment. Those weeds which grow, and mature, among other crops, as cockle amomg wheat, require hand-weeding, else much of the seed will be shed in the harvesting, to await the routine of the next wheat crop.

Others, as the rag weed in stubbles, can only be prevented seeding the ground by the mower.

In agriculture, as in every other warfare, "prudence is the better part of valor." Always take care to sow clean seed. Do not permit *seeding* plants to scatter their seed. And root out all *seedling* weeds while young.

GROUP NO. II—BIENNIALS.

(*Herbaceous.*)

Daucus carota,	Carrot—Wild carrot.
Heracleum lanatum,	Cow parsnip.
Archemora rigida,	Cowbane.
Archangilica atropurpurea,	Great Angelica.
Aethusa cynapium,	
Cicuta maculata,	Water hemlock.
Conium maculatum,	Poison hemlock.
Dipsacus sylvestris,	Wild teasel.
Cirsium lanceolatum,	Common thistle.
Cirsium discolor,	Two-colored thistle.
Cirsium Altissimum,	Tall thistle.

Cirsium muticum,	Swamp thistle.
Cirsium pumilum,	Dwarf thistle.
Cirsium honidulum,	Great yellow thistle.
Plantago major,	Common plantain.
Verbascum thapsus,	Common mullein.
Verbascum blattaria,	Moth mullein—Bullet weed.
Echium vulgare,	Viper's buglos—Blue weed.
Bromus secalinus,	Chess—Cheat.
Lolium temulentum,	Darnel—Rye grass.

COMMENTARY.

The observations made under the former group, will mainly apply, as well to this.

Biennial means two yearly. The plants of this group spring up from seed and form seedling plants, just as the annuals do; but they rest here, and do not usually blossom, and produce seed, until the next summer, after which they soon perish. Often, however, the seeds produced in the summer, vegetate in autumn and form seedling plants, which mature the ensuing season. In this way they anticipate, or shorten, their usual bi-bianularity. Even here we have the seedling and the seeding stages of the weeds, somewhat prolonged, leaving the sluggard culturist still less excusable for his neglect.

The plants of this group, being herbaceous, the leaves of the first year mostly die down in the winter, to be renewed with greater vigor on the return of spring. In some cases, however, the leaves endure the frosts of winter, and are thence called semperviunt, or evergreen.

GROUP NO. III—PERENNIALS.

(*Herbaceous*, *Fruticose*, *Arborescent.*)

Hypericum perforatum,	St. John's wort.
Malva rotundifolia,	Round-leaved mallow.
Rhus glabra,	Common sumach.
Rhus venenata,	Poison sumach.
Rhus toxicodendron,	Poison vine—Poison ivy.
Rubus villosus,	Common blackberry.
Rubus canadensis,	Dewberry—Running brier.
Vernonia, novaeboracensis,	Iron weed.
Eupatorium perfoliatum,	Thorough-stem.
Eupatorium purpureum,	Trumpet weed.
Aster ericoides,	Field aster.
Solidago nemoralis,	Grey golden rod.
Leucanthemum vulgare,	Ox-eye daisy—Pink, &c.
Lappa major,	Burdock.
Taraxacum dens leonis,	Dandelion.
Verbena urticæfolia,	Common vervain.

Leonurus cardiaca,	Mother-wort.
Asclepias incarnata,	Flesh-colored asclepias.
Phytolacca decandra,	Poke—Poke weed.
Rumex crispus,	Curled dock—Sour dock.
Rumex oblusifolia,	Broad-leaved dock.
Rumex acetocella,	Sheep sorrel—Field sorrel.
Symplocarpus fœtida,	Swamp cabbage.

COMMENTARY.

The plants which compose the perennial group, as the term implies, live for an unlimited or indefinite period. They require a series of years to bring them to maturity, as manifested by the production of fruit, after which they continue to grow, and yield seed after their kind, for years, sometimes for centuries, according to their organic and constitutional development.

Generally, the *herbaceous* plants are less enduring than the *fruticose,* and the *fruticose* less than the *arborescent.*

B.—BULBS.

Bulbs appear to be little more than a modification of the rhizome. They spring from a parent plant, contain the germ of a new existence, and are capable of the same complete organic development. They do not, generally, vegetate the first season; the germ remaining in an embryotic state during winter, ready for early development on the approach of spring. Primarily, it has no rootlets. Instead, the major portion of the bulb, consists of albuminous matter, prepared and nicely stored away, by a provident parent, for the future nourishment of the young plant, until it can develop roots for itself. Those who watch the vegetation of early spring bulbs, know that the roots are formed much earlier than the leaves. Charged with the cardinal function of reproduction, bulbs, while invested with their natural envelopes, are almost as vicacious, and enduring as seeds. Many of them will bear exposure to air and sun for months without apparent injury.

The young bulblets which generally may be found clustering round the parent bulb, are easily separated without impairing their vitality. When not disturbed, they grow in clusters, increasing from year to year. If separated and scattered through the soil by tillage or otherwise, they originate other clusters. The *ornithogalum umbeatllum,* or ten o'clock, and *allium vineale,* or common garlic, are familiar examples.

There are several varieties of bulbs: They may be solid, like those named; loosely scaly, as in the lily tribe; or compactly tunicated, as the onion.

They are also radical, produced at the root, in the usual way: Cauline, in the axils of the stem leaves, as in the bulb-bearing lilies; or capitate, where they take the place of flowers, in garlic and onions. These latter fall to the ground, where they readily vegetate. Whatever may be the form or matrix, all bulbs appear to be functionally similar. When vegetating they may be reckoned bulbiferous plants.

There is another approximate form, the *cormus*, or corm, sometimes called a solid bulb. It obtains in the *arum triphyllum*, or Indian turnip; it is not reproductive, and has no proper place in this category.

C.—Tubers.

A tuber appears to be little more than an ordinary rhizome, a portion of which has been expanded into a spherical form by a deposit of albuminous material, designed and prepared to nourish the incipient stage of the plants, which will spring from the buds, or eyes, on its surface. The *solanum tuberosum*, or common potato, is a familiar example.

A few highly noxious weeds are found in this section. They belong to the *genus cyperces*, of which we have several native species. Our own *c. strigosus*, or bristly-spiked galingale, is merely an insightly weed, in moist grounds, of the southern species; *c. repens*, or nut-grass, is becoming a great nuisance; while *c. hydra*, or coco grass, may still prove worse, unless the severity of our climate shall afford us protection. I. S. Skinner characterizes it "the vilest of all pests which has taken possession of, and caused to be abandoned, some of the best sugar estates in Louisiana. Of all things, it is said to be the most tenacious of life; and nothing serves so well to propagate it as to plow and re-plow, with a view to destroy it."

Elliot bears like testimony: "This is becoming a great scourge to our planters. It shoots from the base of its stem, a thread-like fiber, which descends perpendicularly six to eighteen inches, and then produces a small tuber. From this horizontal fibers extend in every direction, producing new tubers, at intervals of six to eight inches, and these immediately send up stems to the surface of the earth, and throw out lateral fibers to form a new progeny. This process is interminable.

* * * * * * * *

"The only process yet discovered by which this grass can be extirpated, is to plow or hoe the spots in which it grows every day through the whole season. In their perpetual efforts to throw their leaves to the light, the roots become exhausted and perish."

The discrepancy between the writers quoted in regard to the plow as a weed exterminator is only apparent. They obviously refer to different methods; one to an occasional use of the instrument, the other to its daily or constant use. Both are right. The distinction should never be forgotten.

The space allotted to this essay will not admit a detailed treatment of the numerous kinds of weeds. Where milder means which reason and inquiry suggests fail to effect a reformation, I would strongly recommend the incarceration of the culprits in the farmers' penitentiary for life. Exclude them entirely from light and air.

Caleb N. Bemont says truly: "It is a settled principle in physiology, that leaves are as essential to plants as lungs are to animals, and that without the healthful exercise of these organs, both the vegetable and the animal will become diseased and ultimately perish. Leaves are as necessary to the roots of plants as roots are to leaves. They are mutually dependent on each other; one cannot long exist without the other. The repeated and complete defoliation of a plant, therefore, must soon be fatal to the roots, and an effectual mode of eradicating them.—*Farmers' Cabinet, vol. 8, p. 87, July 4, 1843.*

This lesson cannot be too often repeated, or too long remembered.

ADDRESS TO FARMERS.

FARMERS: You are the yeomanry, the nobility of the nation. The land is a sacred trust, placed in your hands for use, and, in due season, to be transferred to your successors. Its rich products give sustenance to the whole people. Every class and condition, whatever may be their pretensions, are dependent upon you for bread.

But your land is fast becoming overrun with useless and highly noxious weeds, and its productive value has been greatly impaired thereby. Indeed, extensive tracts have already been tabooed and rendered worthless by them.

Will you betray the trust confided to your keeping? Will you supinely sit down, with folded arms, and ignobly suffer this leprosy to spread its deadening pall around you?

This is not a mere individual or local question. It involves the whole national domain; the entire population. As the land represents the greatness of the nation, so does production represent the resources of the nation. Hence it becomes the interest and the duty, not only of every citizen, but of the State and National Governments, to foster and maintain the health, the integrity, the productiveness of our agriculture.

Unhappily, one indolent and neglectful loafer, on land infested with noxious weeds, may, in a measure, defeat the utmost care and industry of the neighboring farmers, to keep their grounds clean. In such a case, (and such cases are not rare,) the occupant is a ten-fold greater nuisance than his foul and neglected fields.

IS THERE NO REMEDY?

Our cities assert the right, and they resolutely exercise it, to protect themselves against the invasion or spread of diseases, by means of quarantine laws, the removal of nuisances, the rigid enforcement of hygienic regulations, and, if need be, even the forcible exclusion of the occupants from their own premises for a season. Have not the farmers of a district the same rights? Then why should they not be empowered to maintain them?

It is time for you to vindicate your rights; to stand upon your privileges, and to demand the establishment of an Agricultural Board of Health, in every district, invested with powers and resources adequate to maintain a healthy agriculture.

It may be difficult, but the danger is imminent. It will require you to act deliberately, cautiously, wisely, but with a determination that will eventually insure redress.

The tardy arm of the law has been invoked, hitherto, with little benefit. A farm, stocked with Canada thistle, horse nettle, and other noxious weeds, is a horrible nuisance, and ought to be abated. The resources of the occupant may not be sufficient to do this. He should receive assistance from the district. If he neglects or refuses to coöperate, it may be necessary for others to do the work for him, at his expense; or, it may even be required to remove him temporarily from the premises, and to place them in the hands of an agent, until they are fully cleansed and ventilated. The question would then arise, whether the agent should receive remuneration out of the premises, or from the district funds.

This may be called a bold suggestion, but it is not Utopian. It is only asking for agriculture, what law and public opinion have already granted in various other cases.

Yours truly,

E. MICHENER.

POPPLEIN'S SILICATED PHOSPHATE.

PHILADELPHIA, *July 30, 1877.*

Secretary Pennsylvania Board of Agriculture:

DEAR SIR: I have examined, at your request, two samples of wheat straw, marked Nos. 1 and 2, the first having been grown in ground fertilized by Popplein's silicated phosphate, and the second in ground entirely untreated. As a result of careful examination of the residue left after destroying the organic matter by strong nitric acid, I find that neither sample contains any traces of diatom forms, such as has been claimed in articles recently published in certain journals. In further observation upon the general question as to the power of plants to take up undissolved silica, and employ the particles in the construction of cell walls or epidermal covering, I can only say that all the facts of science are against it, and that even if it could be shown that such siliceous forms did occur in any plant, the most reasonable view it seems to me, would be to regard their presence as in the main accidental. The function of nutrition is essentially one of assimilation, that is, the living organism takes up dead matter, and, by certain changes, partly chemical, partly physical, partly of a character not yet understood, it converts this dead matter into living tissue. I can think of no case in which a plant or animal takes up this dead matter, and directly incorporates it into its cell structure. In other words, since the stems of grasses require silica as an ingredient of the cell wall, they can only get this by making the silica in the soil around them a portion of their circulating juices, and then elaborating the material by the ordinary constructive process. In a sample of Popplein's silicated phosphate, which I examined, I found many disks quite large enough to be easily seen by the naked eye, and picked out by the aid of a small pocket lens. These forms are surely too large to be admitted into the pores of grasses, and to circulate in the fluids of the same; besides being quite circular, I do not see any possibility of their interlacing or binding together. I conclude, therefore, that the assertion that plants take up finely divided silica per se is incorrect, and that statements to that effect have been based on erroneous observation.

Very truly yours,
HENRY LEFFMANN, M. D.,
Microscopist Pennsylvania State Board of Agriculture.

THE BEET SUGAR INTEREST.

By H. C. Humphrey.

Secretary State Board Agriculture:

Dear Sir: Allow me to call your attention to the following statistics and statements which have been compiled to show the importance of the beet root sugar industry, its agricultural, and manufacturing status:

The following table exhibits the comparative amounts of beet root and cane sugar produced in the years 1875–76, in the world. And in the case of the beet, the amounts produced in the various European countries:

	Tons.
German Empire,	346,646
France,	462,259
Russia and Poland,	245,000
Austria and Hungary	153,922
Belgium,	79,796
Holland and other countries,	30,000
Total tons beet sugar,	1,317,623
Total tons cane sugar,	2,140,000
Total production of raw sugar,	8,457,623

Thus more than one third of the sugar produced is obtained from the beet.

The following table represents the statistics of the German Empire in regard to the beet sugar industry, as gathered from data in "Stamer's Jahressberigct," the most reliable authority obtainable:

	Amount of beet centners, (110 pounds.)	Amount sugar centners.	Amount molasses centners.	Tax per cent. of beets, (cents.)	Amount received taxes.	O-O sugar extracted.	No. centners beets to produce one centner sugar.
	1.	2.	3.	4.	5.	6.	7.
1836-37, . . .	506,923	28,162	21,789	. . . .	. . . . . .	5.5	18.
1841-42, . . .	5,181,516	284,102	. . . . . .	.59			
1846-47, . . .	5,633,848	402,418	169,015	3.54	$200,000	7.14	14.
1856-57, . . .	27,550,208	2,071,519	633,678	14.16	3,912,271	7.52	13.
1866-67, . . .	50,712,709	4,024,818	1,242,461	17.75	10,001,508	7.9	12.6
1873-74, . . .	70,575,000	5,779,442	. . . . . .	18.93	13,389,827	8.2	12.2
1874-75, . . .	55,072,412	5,011,589	. . . . . .	18.93	10,525,207	9.1	10.99

Column 1 shows the advance which has been made in the industry since 1836. Columns 4 and 5 show the tax which has been levied, and the amounts which have been realized by the government. The average yield of an acre in Germany is 11.7 tons. The tax paid upon this quantity is $45. This amount would be a great offset to the greater cost of cultivation in this country. No data can be found to establish at what price beets may be raised here. Estimates have been given, which vary all the way from sixty-four cents to four dollars a ton. The average of the results of the experience of eighteen persons, is $2 42 per ton. (See section 1, American, April 3, 1869.) These estimates, I think, should not be relied on, as the cost would probably reach three dollars per ton. There are, also, no sufficient data to show the amount of beet roots which can be raised to the acre in this country.

The following tables will elucidate these points as regards Germany, France, and Russia. These estimates were made some years ago, but will serve to give a general idea of the amount raised per acre:

COST OF PRODUCTION. THE DIVISION OF EXPENSES INCURRED.

	Germany.	France.	Russia.
Rent and manure,	$18 73	$38 31	$12 39
Cost of production,	14 28		12 39
Tax,	42 30	49 58	13 52
Cost of manufacture,	50 47	69 11	50 70
	$125 78	$157 00	$89 00
Tons of beets per acre,	11.6	17.9	9.2
Per cent. sugar extracted,	8	6	6
Pounds sugar extracted per acre,	2,078	2,403	1,236

By reference to column 6, of preceding table, it will be seen that the amount of sugar extracted is nine and one tenth per cent., instead of eight per cent., which is the amount extracted at the date of this latter table. I would also call your attention to columns 6 and 7, as showing the gradual increase in the extraction of the sugar from the beet, owing to the production of a better quality of beet, as well as the improvements made in the method of manufacture. As regards the possibility of our being able to raise a beet of good quality, there is very little doubt when we consider that excellent sugar beets have been here produced experimentally, and that the beet flourishes in Europe in such a variety of climate, from Italy to Russia and Sweden. In Sweden, where the season is very short, beets having a high per cent. of sugar, are produced in paying quantities. I would again refer, whilst considering the probability of the production of the beet at a sufficiently low figure, to the enormous sum paid as tax, from $34 to $54 per acre.

As regards the comparative yield of the beet and cane, in Louisiana, the average yield per acre is about seventeen tons, and five per cent. is extracted.

	Pounds.
Amount of sugar produced per acre in Louisiana,	1,904
Amount of sugar produced per acre in foreign cane districts,	1,600 to 4,800
Amount of sugar produced per acre in Germany,	2,078
Amount of sugar produced per acre in France,	2,403
Amount of sugar produced per acre in Russia,	1,236

Only one eighth of the amount of sugar consumed in the United States in 1875, was produced in Louisiana.

The following is an estimate which I have made upon the probable returns of a manufactory consuming fifteen million pounds of beets in one hundred days. The plant would cost about sixty thousand dollars, stock of bone black, (75,000 pounds,) $2,250:

Expenses.

16,350 days' labor at $1 20,		$19 610
Superintendent,	$3,000	
One boiler,	1,500	
One defecator,	1,200	
Book-keeper and clerk,	2,000	
One engineer,	1,000	
Carpenter, &c.,	1,000	
Total skilled labor,		9,700
1,100 tons of coal at $3 50,		3,850
Taxes, insurance,		2,000
Bone black loss,		750
4,500 bushels of lime, at 28,		1,260
Interest on working capital,		3,500
6,696 tons beets, at $4,		26,784
Incidentals,		10,000
Interest on plant,		4,200
Amount total,		$81,654

Returns.

1,200,000 pounds, (8 per cent. yield,) at $8 25,	$99,000
1,227 tons press cake at $4 per ton,	4,908
Molasses,	1,825
Residues as fertilizers,	1,500
Total,	$107,233
Total expenses,	81,654
Profit,	$25,579

I have considered $4 per ton a fair price to pay the farm for the beets. Should it be possible to raise the beets for $3 per ton, there would be for a farm of 578 acres the net profit of $6,704, which is to be added to the above profit, if the manufacturer cultivates his own beets. Eight and one fourth cents per pound is a low estimate for raw sugar. Several refiners, whom I have consulted, consider the value to be 8¾ cents. I have considered the yield of sugar as 8 per cent., although last year in Germany it was $9\frac{1}{10}$ per cent. I have calculated the press cake as work $4 per ton. This is a low estimate. Doctor Goesman, a gentlemen who is perhaps better acquainted than any one in the country with the facts which bear upon the industry, considers that the value of the press cake is $17 40 per acre; this would make the total amount for 578 acres, $9,157, instead of $4,908. I have thought better to choose the latter sum, as there would be a certain prejudice to be overcome before the farmers would be willing to pay the real value.

The above are a few of the facts which I have chosen to present to you, and which have been carefully selected, and I think in respect to the estimates fairly stated.

My views as regards the establishment of this industry are as follows: Starting out with the idea that the important point to be established is, how cheaply can beets of good quality be produced in this country, I would have a company formed of capitalists who are willing, if the preliminary experiments should prove successful, to furnish about $150,000 capital. Two or three farms of from twenty to twenty-five acres should be hired, in sections where the climate and soil appear favorable. These should be cultivated at least two years with beets according to the methods adopted in Germany and France. It appears to me of no use to trust the raising of the beets to the farmers alone. The experiment has been tried repeatedly, and it has proved almost impossible to overcome their prejudice as regards the proper method of cultivation, the amount of beets produced, the per cent. of saccharine matter, &c. The total cost should be carefully noted. If it was desired, the raw sugar could be extracted, although this is not essential, as the subject has been so well studied abroad that the amount of sugar obtainable from a beet of a certain quality could be very closely estimated. From these experiments the amount and cost of raising the beet could be fairly calculated; if the results should be satfactory, the land could be purchased and the manufactory built. The experiment would not be expensive, as the crop of beets could be sold, and go far to repay the outlay. It is, of course, not probable that as satisfactory results as are figured will be obtained for several years, but there seems to be little doubt that the government and State aid might be procured. Already in Canada they have offered $7,000 a year, and exemption from taxes for ten years, to the first manufacturer. In Maine, the same inducements are offered, one cent a pound until the amount reaches $7,000. With that surety, capital would run small risk in making the venture.

I have presented the above facts to you, hoping that I may receive your opinion as regards this matter, and also that you will criticise any statement which you may think not to be correct. Any such remarks or criticisms, which you may be pleased to make, will be very much valued, as I am anxious in bringing this matter before the public, that no errors should be made, no expectations excited which will not be realized.

The whole matter, if started, must be carefully considered and carried out with extreme caution, as one failure, even if due to some mistake on the part of the management, would result most disastrously to the undertaking.

I remain,
Very truly yours,
H. C. HUMPHREY.

LABORATORY, 113 WALNUT STREET,
PHILADELPHIA, *April 4, 1877.*

SILK PRODUCTION IN PENNSYLVANIA.

By SAMUEL CHAMBERLAIN, BRYN MAWR, PA.

Secretary Pennsylvania State Board Agriculture:

DEAR SIR: The undersigned, on behalf of more than sixty citizens of the State, respectfully asks of the board to devise means for setting in operation the culture of raw silk in Pennsylvania.

These sixty-seven citizens (a copy of whose names is inclosed) petitioned the Legislature (both last year and this) to pass an act for the promotion of this culture, and, in addition to it, for the advancement of knowledge respecting all insects beneficial or injurious to the farmers.

It was urged before the Committees on Agriculture:

1. That other States were giving attention to these insects; that Massachusetts, Connecticut, New York, Illinois, and Missouri have appointed, each, a special officer (State Entomologist) for this purpose, and that very beneficial results have followed to the fruit, grain, and root crops in those States.

2. That silk culture is now being prosecuted, both in Kansas and California, (and more recently in New Jersey,) and with eminent success in the production of excellent silk, [see enclosed editorial of the Philadelphia *Inquirer*, for one of many proofs;] and, also, in the production of silk worms' eggs, in which a trade with France has begun.

3. That silk of the best quality was formerly (in 1830–40) produced in Pennsylvania. Evidence of this is furnished by letters from parties engaged, at that time, in the culture, which letters are now in possession of the undersigned.

4. That failure to establish the industry was due to speculation in the trees, and to the want of a home market, which want is now supplied by 213 silk mills in the United States, ready to buy all the raw silk that can be made. These mills, of which 24 are in Pennsylvania, made, in 1875, one half of the silk consumed in the United States.

5. That a large annual business in raw silk, and in silk worms' eggs, can be secured to Pennsylvania, by proper action on the part of the State, giving aid and encouragement to the culture. Five and a half million dollars have gone annually from the country for raw silk, and six million dollars' worth of silk worms' eggs have passed annually, for three years, over our Pacific railroad, on the way from Japan to France.

6. That there are, probably, mulberry trees enough in Pennsylvania to make all this silk, and to produce all these eggs.

7. That there are unemployed persons in Pennsylvania, sufficiently able to produce all this wealth through this culture.

8. That intelligent guidance and direction are wanted to turn the attention of citizens to this industry.

9. That the certainty of increased revenue to the State, from a new industry, warrants such moderate expenditure as would insure the establishing of this industry, and the consequent addition to the incomes of the citizens.

In the House committee of last year, it was suggested that the objects of the petition should be attained by an additional professorship (of entomology) in the State Agricultural College. Whether in this, or in some other way, the wishes of these petitioners be carried out, the measure can scarcely fail to be directly beneficial to the State, and to the interests of all classes of her citizens. And the purpose of this communication is to ask of the board to give this matter their attention, and, if possible, to devise proper means to effect it.

Respectfully, and on the part of the 67 citizens, whose names are appended to the above mentioned petition.

BRYN MAWR, PA., *January 30, 1877.*

Through the courtesy of the publishers, the following papers are furnished for the reading table of the board:

AGRICULTURAL PAPERS RECEIVED.

WEEKLY.

Kansas Farmer,	Topeka, Kansas,	J. K. Hudson.
Western Farmer,	Des Moines, Iowa,	G. Sprague.
Maine Farmer,	Augusta, Maine,	Homan & Badger.
Colorado Farmer,	Denver, Col.,	J. S. Stanger.
Prairie Farmer,	Chicago, Ill.,	Prairie Farmer Co.
Practical Farmer,	Philadelphia,	Practical Farmer Co.
American Rural Home,	Rochester, N. Y.,	
Bucks County Inteligencer,	Doylestown, Pa.,	H. Darlington & Co.
Germantown Telegraph,	Philadelphia,	P. R. Freas.
Country Gentleman,	Albany, N. Y.,	L. Tucker & Sons.
Husbandmen,	Elmira, N. Y.,	Husbandmen Co.

MONTHLY.

American Agriculturist,	New York,	O. Judd & Co.
Southern Cultivator,	Athens, Georgia,	W. L. Jones,
Farm Journal,	Philadelphia,	W. Atkinson.
American Farmer,	Baltimore, Md.,	S. Sands & Son.
National Record,	New Denmark, N. J.,	National Record Co.
Gardener's Monthly,	Philadelphia,	C. H. Marot.
Scientific Farmer,	Boston, Mass.,	Scientific Farmer Co.

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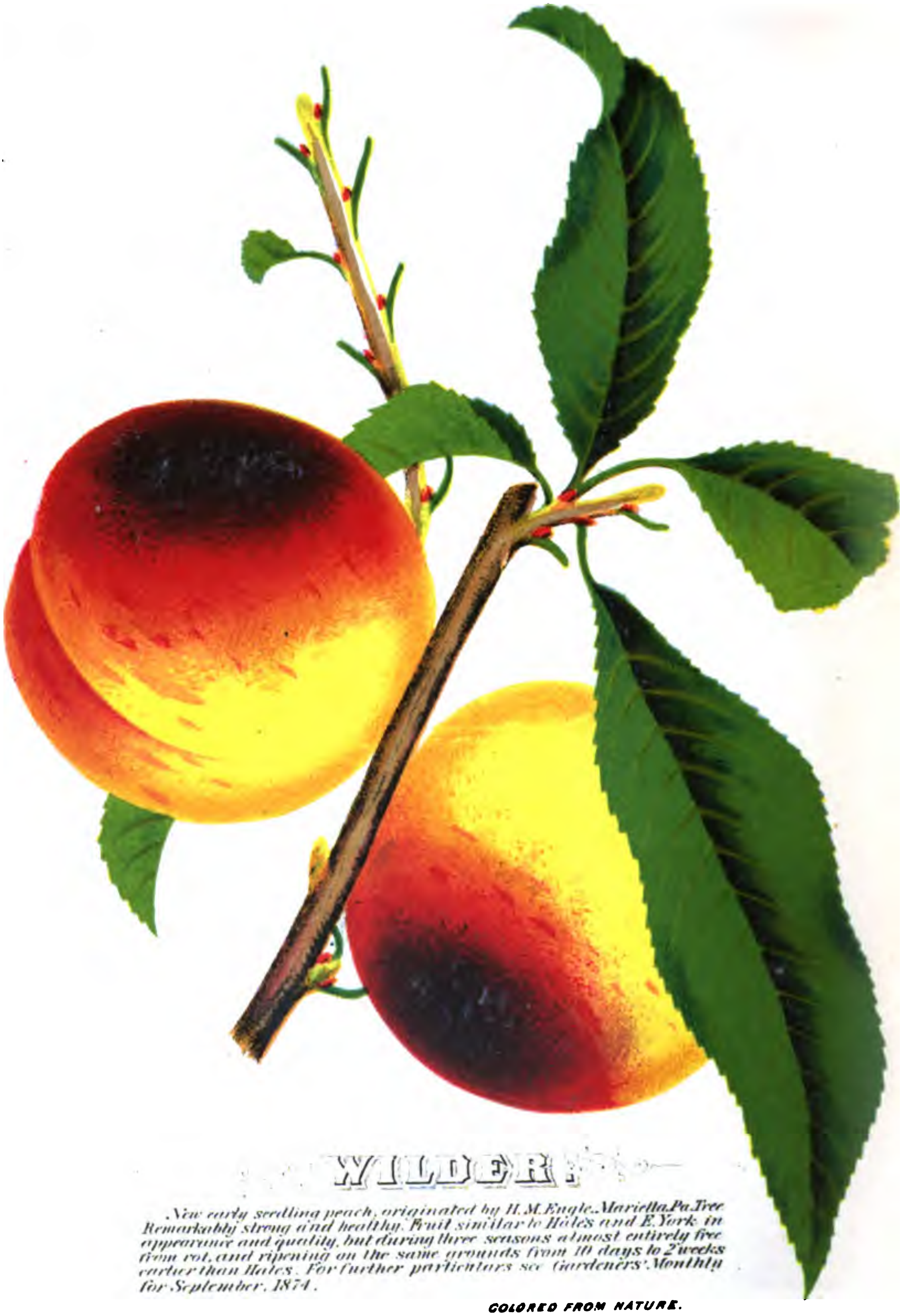

WILDER.

New early seedling peach, originated by H. M. Engle, Marietta, Pa. Tree Remarkably strong and healthy. Fruit similar to Hale's and E. York in appearance and quality, but during three seasons almost entirely free from rot, and ripening on the same grounds from 10 days to 2 weeks earlier than Hales. For further particulars see Gardeners' Monthly for September, 1874.

COLORED FROM NATURE.

UNIV OF MICH.

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ANNUAL [illegible]

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18[illegible]

HARRISBURG:
LANE S. HART, STATE PRINTER.
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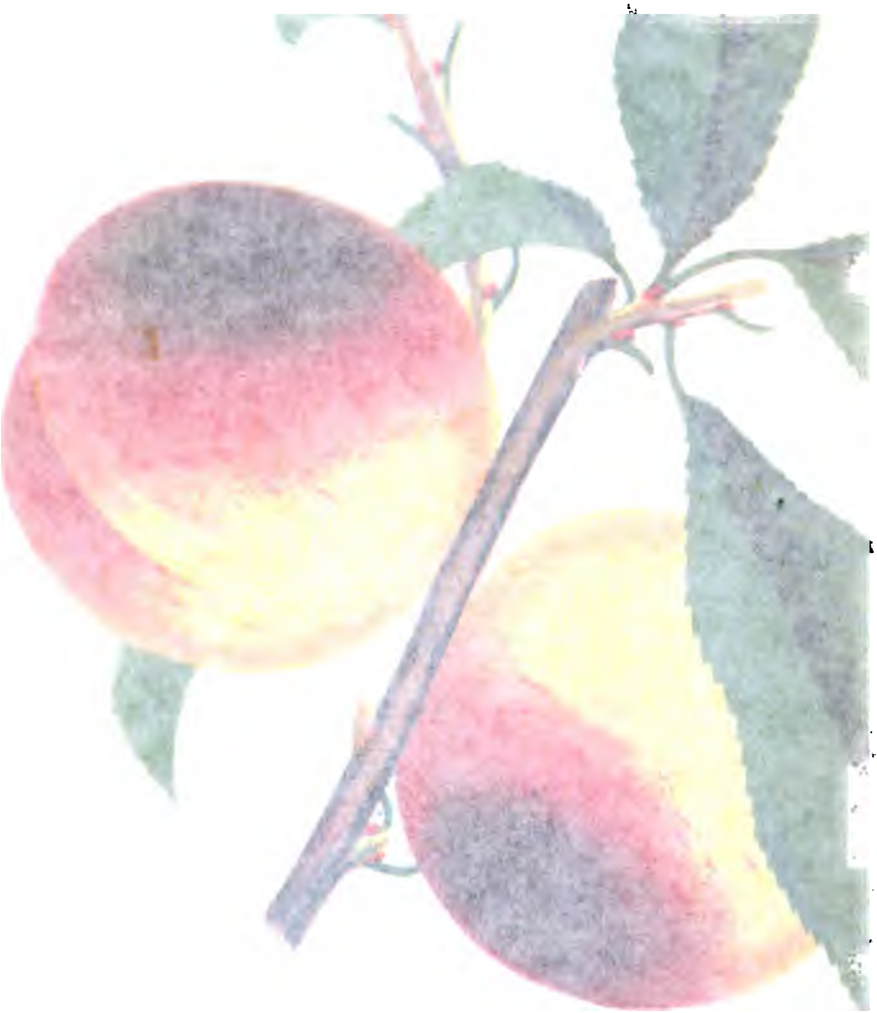


WILDER.

New early seedling peach, originated by H. M. Engle, Marietta, Pa. Free, remarkably showy [illegible] in this fruit [illegible] Hales and [illegible] [illegible] [illegible] seasons almost entirely [illegible] [illegible] [illegible] ripens from 10 days to 2 weeks earlier than Hale's. For further particulars see Gardener's Monthly for September, 1874.

COLORED FROM NATURE.

REPORT

OF THE

PENNSYLVANIA FRUIT GROWERS' SOCIETY.

PREPARED BY ITS OFFICERS.

1877.

HARRISBURG:
LANE S. HART, STATE PRINTER.
1877.

CONSTITUTION.

ARTICLE 1. This association shall be entitled "*The Pennsylvania Fruit Growers' Society*," and its objects shall be the advancement of the science of pomology and the art of fruit culture generally.

ARTICLE 2. Any person may become a member of this Society by a vote of the majority of the members present, at any meeting, and by paying into the treasury the sum of one dollar annually; or the payment of one dollar to the treasurer, at any time, shall constitute membership, and entitle said member to a copy of the proceedings. The payment of ten dollars, at one time, will constitute life membership.

ARTICLE 3. Its officers shall consist of a President, three Vice Presidents, a Recording and Corresponding Secretary, and a Treasurer, all of whom shall be elected annually by ballot.

ARTICLE 4. The following standing committees shall be appointed: A Committee of five on Nomenclature; a Committee of three on Insects, of whom the Professor of Entomology shall be chairman; an Executive Committee, consisting of the President, Recording Secretary, and Treasurer; and a general Fruit Committee, consisting of one member from each county represented, with a general chairman of the whole; each member of the Local Fruit Committee to have the privilege of appointing two assistants.

ARTICLE 5. The Society may at any time elect honorary members.

ARTICLE 6. The Society may from time to time appoint Professors on Entomology, Botany, Horticultural Chemistry, and Geology.

ARTICLE 7. This constitution may be altered or amended by a vote of two thirds of the members present, at any regular meeting, notice of the proposed amendment, in writing, having been previously given.

ARTICLE 8. Seven members shall constitute a quorum for the transaction of business.

BY-LAWS.

ARTICLE 1. The Committee on Nomenclature shall collate and decide the standard and synonymous names of all fruits known in the Society, with the authorities for each, and report, so far as practicable, at each regular meeting, and record the same in a book kept for that purpose.

ARTICLE 2. The General Fruit Committee shall carefully and thoroughly investigate the subject of fruit culture in general. Each local committee of three shall collect such useful and interesting information in relation to the subject as may be in their power, and embody the same in monthly reports, to be made to the general chairman; such reports to be by him examined and embodied in his annual or semi-annual reports. Also, that the said county committees shall form *ad interim* committees for their respective counties; and further, that said *ad interim* committees are hereby authorized to publsh their reports in the "*Gardener's Monthly*," or such other paper as they may select, the same having been first submitted to the chairman of the General Fruit Committee for his approval: *Provided*, That said publication shall be free of expense to the Society.

ARTICLE 3. The annual meeting of the Society shall be held on the third Wednesday of January of each year, at such place as the Executive Committee may appoint, at which time the election for officers shall take place; said officers to serve from the close of the meeting, at which they are elected, to the close of the succeeding annual meeting, at which time an exhibition and discussion of fruits shall take place, and other business transacted in the following order:

1st. Reading of minutes of previous meeting.
2d. Roll called and dues collected.
3d. Election of officers.
4th. Reports of officers.
5th. Reports of standing committees.
6th. Reports of special committees.
7th. Unfinished business of former meeting.
8th. New business.

The nomination and election of new members shall be in order at any time during the session.

ARTICLE 4. Other meetings may be convened by the Executive Committee at such time and place as they may appoint.

ARTICLE 5. No member who is in arrears for dues shall be eligible for any office, or serve on any standing committee; and any member who shall neglect to pay his dues shall cease to enjoy the privileges of membership.

LIST OF OFFICERS FOR 1877.

PRESIDENT.

JOSIAH HOOPES, West Chester, Pa.

VICE PRESIDENTS.

H. M. ENGLE, Marietta.
GEORGE H. SMALL, Harrisburg.
JOHN I. CARTER, West Grove.

RECORDING SECRETARY.

E. B. ENGLE, Marietta.

CORRESPONDING SECRETARY.

WM. P. BRINTON, Christiana.

TREASURER.

G. B. THOMAS, West Chester.

PROFESSOR OF BOTANY.

THOMAS MEEHAN, Germantown.

PROFESSOR OF ENTOMOLOGY.

S. S. RATHVON, Lancaster.

PROFESSOR OF HORTICULTURAL CHEMISTRY.

S. B. HEIGES, York.

STANDING COMMITTEES FOR 1877.

GENERAL FRUIT COMMITTEE.

John I. Carter, Chester co., *chairman*.
Casper Hiller, Lancaster co.
H. T. Darlington, Bucks co.
A. R. Sprout, Lycoming co.
S. W. Noble, Montgomery co.
E. J. Evans, York co.
G. H. Small, Dauphin co.
A. S. Sheller, Union co.
W. L. Schaeffer, Philadelphia.
J. Murdoch, Sr., Allegheny.
H. S. Rupp, Cumberland co.
G. D. Stitzel, Berks co.
H. Leh, Jr., Lehigh co.
Jos. Lewis, Jr., Delaware co
Rev. Jas. Calder, Centre co.
Jacob Heyser, Franklin co.
W. M. Pannebaker, Mifflin co.

COMMITTEE ON NOMENCLATURE.

H. M. Engle, Lancaster co., *chairman*.
Calvin Cooper, Lancaster co.
J. H. Bartram, Chester co.
A. W. Harrison, Philadelphia.
J. W. Pyle, Chester co.

COMMITTEE ON FLORICULTURE.

Chas. H. Miller, Philadelphia, *chairman*.
Thomas Meehan, Germantown.
Peter C. Hiller, Lancaster co.
H. S. Rupp, Cumberland co.
S. H. Purple, Lancaster co.

COMMITTEE ON ARBORICULTURE.

Geo. Achelis, Chester co., *chairman*.
Daniel G. Engle, Lancaster co.
R. B. Haines, Montgomery co.
G. H. Small, Dauphin co.
Wm. Hacker, Philadelphia.

COMMITEE ON ORCHARDING.

E. Satterthwait, Montgomery co., *ch'mn*.
W. S. Bissell, Philadelphia.
J. G. Engle, Lancaster co.
E. H. Cocklin, Cumberland co.
T. M. Harvey, Chester co.

COMMITTEE ON INSECTS.

S. S. Rathvon, Lancaster co., *chairman*.
J. S. Stauffer, Lancaster co.
S. B. Heiges, York co.

LIFE MEMBERS.

Bartram, J. Hibberd, Milltown, Chester co.
Brinton, W. P., Christiana, Lancaster co.
Bissell, W. S., Pittsburg.
Calder, Rev. James, Agricultural College, Centre co.
Cornelius, Robert, Philadelphia.
Ellis, B. Morris, Hughesville, Lycoming co.
Engle, J. G., Marietta, Lancaster co.
Engle, H. M., Marietta, Lancaster co.
Garrettson, Joel V., Flora Dale, Adams co.
Hayes, Charles P., Germantown.
Heyser, Jacob, Chambersburg, Franklin co.
Hildrup, W. T., Harrisburg, Dauphin co.
Hoopes, Josiah, West Chester, Chester co.
Hiller, Casper, Conestoga, Lancaster co.
Hiller, Peter C., Conestoga, Lancaster co.
Hacker, Wm., Philadelphia.
Landis, Israel, Lancaster, Lancaster co.
Martin, J. O., Mercersburg, Franklin co.
Pannebaker, Wm. M., Lewistown, Miffin co.
Reist, Peter S., Oregon, Lancaster co.
Shaffner, Jacob, Wheatland, Dauphin co.

HONORARY MEMBERS.

Downing, Chas., Newburg, N. Y.
Meehan, Thomas, Germantown, Pa.
Michener, Dr. E., Tough Kenamon, Chester co., Pa.
Parry, Wm., Cinnaminson, N. J.
Rathvon, Prof. S. S., Lancaster.
Rowe, Hon. D. Watson, Chambersburg.
Saunders, William, Washington, D. C.
Stauffer, Jacob S., Mount Joy, Lancaster co., Pa.
Thomas, John J., Union Springs, N. Y.
Warder, Dr. John A., Cincinnati, Ohio.
Willets, Rev. Dr., Philadelphia.
Wilder, Hon. M. P., Boston, Mass.

ANNUAL MEMBERS.

Achelis, George, West Chester.
Applebaugh, R. T., McVeytown.
Biddle, T. C., Chadd's Ford, Delaware co.
Blessing, Paul, Jr., Coatesville.
Boas, A. T., Reading.
Bombaugh, Aaron, Harrisburg.
Brandt, Dr. E. B., Mechanicsburg.
Brindle, A. C., Mechanicsburg.
Brinton, S. L., West Chester.
Brinton, Moses, Octoraro,
Burkholder, John., Bendersville, Adams county.
Carter, John I., West Grove.
Christmas, Isaac F., Stonersville, Berks county.
Cocklin, E. H., Shepherdstown, Cumberland county.
Cocklin, Jacob, Shepherdstown, Cumberland county.
Cooper, Calvin, Bird-in-Hand.
Cummings, R. M., Montandon.
Darlington, Henry T., Doylestown.
Davis, E. M., 205 Walnut place, Phila.
Dykeman, G. R., Shippensburg.
Eby, J. R., Harrisburg.
Eby, Simon P., Lancaster.
Edge, Thomas J., London Grove, Chester county.
Engle, E. B., Marietta, Lancaster county.
Engle, Daniel G., Marietta, Lancaster co.
Erb, John B., Lampeter, Lancaster co.
Evans, E. J., York.
Fisler, I. E., box 214, Harrisburg.
Frantz, M. A., Harrisburg.
Frazer, Isaac, Mechanicsburg.
Garber, J. B., Columbia.
Geddes, Samuel, Philadelphia.
Gross, D. M., Harrisburg.
Grover, Leverett, Windsor, Ohio.
Guthrie, W. D., Chambersburg.
Haines, R. B., Cheltenham, Montgomery county.
Haines, John S., Germantown.
Hamilton, A. Boyd, Harrisburg.
Harrison, A. W., Queen st., Germantown.
Harvey, Thos. M., West Grove, Chester co.
Heiges, S. B., York.
Heiges, J. M., York.
Hiester, Chas. E., Harrisburg.
High, Ezra, Reading.
Hoopes, Abner, West Chester.
Hostetter, H. F., Oregon, Lancaster co.
Huber, John, Litz, Lancaster county.
Hunewell, J. T., McVeytown, Mifflin co.
Irvin, James, Ickesburg, Perry co.
Kauffman, Levi, 400 Walnut st., Phila.
Kendig, M. D., Cresswell, Lancaster co.
Kiner, A. N., Shippensburg.
Landis, B. L., Landis Valley, Lancaster county.
Leh, J. H., Allentown.
Lewis, Joseph, Jr., Newtown Square, Delaware county.
Lingle, John L., Harrisburg.
Linn, John, Chambersburg.
Lint, Peter, York.
Longsdorf, H. A., Mechanicsburg, Cumberland county.
Martin, Tobias, Mercersburg, Franklin co.
McMillan, C. C., Gettysburg.
Miller, D. N., Harrisburg.
Miller, Chas. H., Mt. Airy, Philadelphia.
Mitchell, J. E., 310 York ave., Phila.
Mumma, Hon. D., Harrisburg.
Neff, J., Dallastown, York county.
Nissley, C. B., Mechanicsburg.
Noble, S. W., Jenkintown, Montgomery county.
Parker, J. T., Mercersburg, Franklin co.
Potts, W. C., Lewisberry, York county.
Pownall, Levi, Christiana.
Purman, Wm. J., Tallahasse, Florida.
Purple, S. H., Columbia.
Pyle, J. W., Willow Dale, Chester co.
Reed, Wm. G., Chambersburg.
Reist, Levi S., Oregon, Lancaster county.
Reynolds, S. H., Lancaster.
Rhoads, Dr. R. B., Douglassville, Berks county.
Roberts, Rowland, Horsham.
Rufe, Morgan, Doylestown.
Rupp, H. S., Shiremanstown, Cumberland county.
Rush, John A., McVeytown.
Satterthwaite, E., Jenkintown, Montgomery county.

Saxton, J. O., Mechanicsburg.
Schæffer, W. L., Girard National Bank, Philadelphia.
Sharp, S. W., Newville, Cumberland co.
Sheller, Alf. S., Lewisburg, Union co.
Sheetz, J. A., Womelsdorf, Berks county.
Shelly, Daniel, Shiremanstown, Cumberland county.
Shenk, Major R. W., Lancaster.
Shoch, Samuel. Columbia.
Shoemaker, R. C., Jarrettstown, Montgomery county.
Small, G. H., Harrisburg.
Small, Samuel, York.
Smith, F. L., Reading.
Snively, John K., Jackson Hall, Franklin county.
Snyder, David, Bath, Northampton co.
Sprout, A. R., Picture Rocks, Lycoming county.
Steck, Dr., Picture Rocks, Lycoming co.
Stevenson, S. L., Clark's Green.
Stitzel, Geo. D., Reading.
Stouffer, John, Chambersburg.
Suesserott, Dr. J. L., Chambersburg.
Thomas, G. B., West Chester.
Thomas, R. H., Mechanicsburg.
Tracy, S. M., practical farmer, 518 Walnut street, Philadelphia.
Underwood, Alex., Mechanicsburg.
Weaver, Reuben, Mastersonville Lancaster county.
Weiser, B. H., York.
Williams, J. S.. New Hope, Pa.
Young, John G. B., Reading.
Young, Wm., Reading.

PENNSYLVANIA FRUIT GROWERS' SOCIETY.

The eighteenth annual meeting of the Pennsylvania Fruit Growers' Society, which convened at Lancaster, January 17, 1877, although not so largely attended as some of its former sessions, was one of more than ordinary interest. The display of fruits, though not extensive, included some fine specimens and several new varieties which attracted much attention. The annual routine of business was promptly transacted, and the several topics which were taken up and discussed at subsequent sessions elicted much that is of value to the horticulturist and fruit grower. The Lancaster County Agricultural and Horticultural Society, upon whose invitation this Society held its meeting here, had made ample arrangements by securing a suitable hall and making other provisions for our convenience and comfort.

THE MEETING.

President Satterthwait called the Society to order at two o'clock, and after the reading and approval of minutes of previous meeting, President Cooper, of the Lancaster County Society, arose and, in the following address, cordially welcomed the Pennsylvania Fruit Growers' Society to their city:

MR. CHAIRMAN: In behalf of the Lancaster County Agricultural and Horticultural Society, I have the pleasure of welcoming you to the city of Lancaster. Our county may not be as far advanced in horticulture as some of its neighbors, though we claim that it is well up in the race for agricultural distinction. We anticipate much pleasure in attending the sittings of your Society here, and expect to reap some benefit, from the very able and practical gentlemen who participate in the discussions of the various subjects proposed for your consideration. I therefore again bid you welcome to this city, to the use of this room, and such other hospitality as the members of our Society may extend to you.

President Satterthwait briefly responded, thanking the local society for the cordial reception. He anticipated much satisfaction, as well as instruction to be derived from our meeting here, and thought there is no section in our State that afforded better opportunities for the horticulturist and fruit grower.

Calling the roll and collection of dues were next in order, but, on motion, were postponed to a subsequent meeting.

The next order of business was the annual election of officers, but, at the suggestion of the President, it was also postponed.

Subsequently, on motion of Mr. Hoopes, a committee of five, consisting of Messrs. Harvey, Hiller, Carter, Meehan, and Sheller, was appointed to nominate candidates for the several offices, and report at a subsequent meeting.

The Treasurer, Mr. G. B. Thomas, submitted his annual report, which was referred to an auditing committee, consisting of Messrs. Hiller, Small, and D. G. Engle. Report of the Treasurer:

GEORGE B. THOMAS, *Treasurer, in account with Pennsylvania Fruit Growers' Society.*

DR.

1876.		
Jan. 20.	To cash received from former Treasurer, ...	$261 38
	cash received annual dues, ...	28 50
21.	cash received "Donation of a Friend,"	5 00
May 16.	cash received annual dues from February 5, . . .	23 00
	cash received John Linn, per E. B. Engle, ...	1 00
		$318 88

CR.

1876.		
Jan. 20.	By cash paid E. B. Engle, as per bills, ...	$28 50
21.	cash paid E. B. Engle, as per bills, ...	20 71
Feb. 1.	cash stamps and envelopes sending out, ... 110 statements for annual dues, ...	3 56
1877.		
Jan. 9.	By cash paid 1 quarto blank book, ...	85
	balance, ...	265 26
		$318 88

DR.

Jan. 17.	To cash on hand, ...	$265 26

Correct:

CASPER HILLER,
G. H. SMALL,
DANIEL G. ENGLE,
Auditors.

The chairman of the General Fruit Committee submitted his annual rereport:

Mr. President and Gentlemen:

In presenting to the eighteenth annual meeting of this Society a general report of the fruit interests of our State, I have only to say, in advance, that it will fall far short of what it should be. Seventeen years ago the first annual meeting of this Society was held in this city. A constitution and by-laws were adopted by which its deliberations should be governed. The aims and prospects of the new organization were hopefully and confidently sketched by its first president, and first chairman of General Fruit Committee. A few extracts, I trust, will on this occasion not be out of place. The president in his first address says: "The Fruit Growers' Society of Eastern Pennsylvania is now organized, and its objects set forth. There is for us all something to do and to learn. The field and garden are before us, obstructions to be removed, obsolete theories and impoverished surface to be turned under, improved methods and virgin soil substituted and brought to the surface. If our climate be variable, attention to locality, protection by belts of trees, thorough culture, and selection of proper varieties may in part overcome these difficulties. Onward, then, to the goal of success."

From the report of the chairman of General Fruit Committee I quote: "In many departments of rural industry, eastern Pennsylvania stands unrivaled. Her rich soil, the intelligence and energy of her citizens, called forth and properly applied, will give her a position in this department also, second to no other portion of the Union. In indulging this hope we cannot too strongly present to the consideration of our citizens its importance, and when Eastern Pennsylvania shall consider fruit growing of equal importance with other branches of her rural industry, we shall then begin, and not till then, to throw off our dependence on other States for articles which we almost imagine we can now see formed and fashioned in our very soil, and only wanting pomological spirit and energy to bring forth. With fidelity on the part of each and every one in the discharge of his duties as officer or member, we may anticipate the day when it will be said that the Fruit Growers' Society of Eastern Pennsylvania has done the State some service."

Would it not be well on this occasion to consider what has been accomplished toward reaching so grand an object as that set forth by some of the early pioneers of this organization. A number of those who enlivened the counsels of our meetings in the first period of the existence of this Society, have passed away, and their places are filled by new enlistments. A majority, however, of the first members are still laboring earnestly in the interest of pomology, whose presence we heartily greet at our annual meetings.

The difficulty of presenting to you a full and reliable report of the fruit interests of our State has thus far been great, as, I believe, every chairman of the General Fruit Committee preceding me has borne witness. The membership of the Society has thus far extended to not half the counties of the State. The failure to appoint local fruit committees for several years has thrown the responsibility of collecting the necessary information for these reports upon the chairman of the General Fruit Committee. In 1875, I mailed a list of questions to about half the counties in the State, but responses came from comparatively few. In 1876, I mailed postal cards with questions for information, into every county in the State. About twenty have responded, embracing about as many counties. Some of the responses are quite brief, but most of them are interesting. I propose to read during our sessions some of them, if desired, and all of value I shall pass to the publication committee, to select from for the next annual report of these proceedings. To all who have so readily responded, I hereby return my sincere thanks. I would also suggest, that action be taken at this meeting to send a copy of the present proceedings to all who have made responses, whether they be members of this Society or not. Such course, in my opinion, would increase our resources for obtaining valuable information in the future. I would further suggest, that for the purpose of extending the usefulness of the Society, and to aid my successor in collecting horticultural information, measures be taken to obtain the address of one or more prominent fruit growers in every county in the State. In sending out questions into counties, where I knew no one of our calling, I simply addressed "Some Prominent Fruit Grower," generally directed to the county seat. In this way I have received some very excellent responses. I believe there is not a county in the State from which I would not have received a reply had I known the address of the proper persons. I have learned also, that quite a number of counties have no agricultural nor horticultural organization. The local committees should all be appointed as early as possible, and the list of members forwarded to the chairman of the General Fruit Committee early in the season, instead of after the fruit season has passed. Such a course would aid in bringing out a more thorough and reliable report, and would also be more in accordance with the constitution and by-laws of the Society. To make up a report, such as might be expected under a properly arranged system, and such as is due this Society, will involve more labor and expense to the general chairman, than men usually are disposed to incur as a luxury. Let us, however, not stop short of any measures that may be necessary to make the Pennsylvania Fruit Growers' Society the real representative of the fruit and horticultural interests of the entire Keystone State. May our State never again be so far behind other States in the display of her fruit interests as was the case at the Centennial. While her fruit crops were in such profusion, it is all the more humiliating. Had it not been for the refusal of our Legislature to make any appropriation for the collection and display of her fruits, the case would have been far otherwise. Thousands of dollars were appropriated by other Legislatures for the purpose of having the fruits of their respective States shown to the world, and well did it tell in Pomological Hall at the Centennial. The committee appointed at our last annual meeting made every reasonable effort to secure the necessary means, in addition to their own services, for the purpose of collecting and exhibiting the fruits of our State at the Centennial; but after failing to secure a State appropriation, your committee did not consider it incumbent upon them to assume any further responsibility, and thus the attempted enterprise proved abortive.

The attempt to compile a general report from the various reports of the sub-committees, makes this a very complicated task. The conflicting reports, even from the same localities, are sufficient to confuse any one. No doubt all this apparent contradiction could be reconciled and satisfactorily explained, had we a knowledge of all the conditions and circumstances connected therewith, and capacity to dissect and analyze all the varied results. This, however, is the problem to be solved. Let it not be understood that the sub-reports are conflicting throughout. Almost without exception, the apple crop is reported as one of the fullest ever known; equal, or nearly equal to that of 1872, which was then considered the largest for more than twenty years. The crop of 1872, followed a very severe and open winter, and the summer season was one of the hottest for a long period of years, which is generally considered unfavorable to fruit. Now, that after a period of only four years, we should have a similar apple crop under very similar circumstance, may invite discussion as to the causes. True, the last winter was open and mild, instead of open and severe as was that preceding the crop of '72, but the heat of the past summer was reported as even greater than that of '72. It is conclusive that the seasons have much bearing upon all crops, fruit not excepted, but in the diffusion of knowledge the object should be to impress growers with the possibility of raising good crops in adverse seasons. No honor to him who secures good crops only when the seasons are favorable, but he who can make a fine exhibit when the elements have been against him, and those around him fail, is master of the situation. His neighbors must often pay him nicely in order to share with him the luxuries of the season.

Although the apple crop was one of the largest ever produced in the State, the tendency to premature ripening, and the equinoxial storm caused a large proportion of the crop to be converted into cider, and some to rot; that after all, the north and east are shipping thousands of barrels into our State, which proves that we have not yet attained that independence which the first chairman of our General Fruit Committee had pictured in his report in 1860. One of the principal causes of such a result is the failure of planting a sufficiency of our surest native winter apples. Far too large a proportion of our summer, fall, and winter apples from the north have been planted, which fail to supply the home demand for winter use. If, in a fruitful season like the past, the improved methods for drying fruits were brought more generally into requisition, a large proportion of the crop could be preserved to take the place of green fruits annually shipped into our State. The question, what are the most valuable varieties of winter apples for the different sections of our State, should be ascertained and the result disseminated. This will require close observation and untiring energy and perseverance on the part of all interested in the matter. The York Imperial and Smiths' Cider stand unsurpassed, if not unrivalled, in their respective localities, as certain bearers and good keepers. The old Rambo, as an early winter fruit, has no doubt been too much crowded out by new and popular kinds from other States. The many excellent local varieties throughout the State, if properly disseminated, would be ample to make Pennsylvania a fruit-exporting, instead of an importing, State. The long lists of varieties confuse many planters. If all the inferior kinds were wiped out of existence, it would inaugurate a new era in this most valuable of all our fruits.

PEARS.

The cost of trees, and greater liability to disease than the apple, prevent their general planting, more than all other drawbacks connected with their cultivation. The greater value of the fruit. however, is a sufficient stimulus to more extensive planting. The markets in our cities and large towns are evidences that the crop is not an insignificant one, and apparently more certain than the apple. Too many varieties, however, come into competition with the peach crop, which reduces their market value. Good, reliable winter pears are still wanting to bring this fruit to its real importance. A number of new varieties lately introduced will likely induce more extensive planting.

THE PEACH.

Peach culture in Pennsylvania is becoming a very important crop. The moderate crop of Delaware and Maryland, the past season, made that of our State of considerable importance. Of course the abundance and cheapness of apples caused prices to rule lower than they would otherwise have done. In their season, peaches are more sought for, and consumed in larger quantities than all other fruits combined. The recent introduction of so many new early and late varieties of promising value, thus prolonging its season, makes this crop of still more importance. Although more partial to certain soils and localities than the apple, the section of our State south of the Susquehanna and Juniata rivers contains thousands of acres so well adapted to this fruit, that it will yet become a rival to the eastern peach-growing regions. Not that this section is uniformly adapted to this crop like the east, but the large tracts of slate, gravel, and sand, with natural drainage, should be a sufficient inducement to embark extensively in the peach-growing enterprise. Like any other business, it can grow only with a knowledge thereof, but the basis is there. Let it not be understood that peaches are not successfully grown north of the Susquehanna, but, as we move northward, it becomes more precarious, and can be fruited only in the most favorable localities and in favorable seasons.

The Old Mixon, Stump, Early, and Late Crawford, and Smock's Late we find among the leading varieties. Hales is almost entirely discarded, but fortunately there are a number of candidates to both succeed and supersede it. One of the most prolific causes of the early decline of many peach trees is over-bearing. Yellows appear to spread with alarming rapidity in sections where it was formerly unknown, and nurserymen cannot be too careful in the selection of seeds and buds, from which to propagate. A few remedies are advocated, but probably none prove really effective.

PLUMS.

Plum culture appears to be on the increase, especially in some sections, but the general drawback is the old enemy, curculio. One of my correspondents reports that the "Little Turk" generally leaves his trade-mark on nearly every specimen. According to reports, with few exceptions, he is left to have his own way, so that the prospect of soon having our markets stocked with Plums, as with other fruits, is not encouraging.

GRAPES.

Considerable rot is reported, but the general crop has been nearly, or perhaps a full, average. Concord is still the leading kind. In some localities it has rotted badly, which indicates that it may lose some of its former popularity. Martha, Telegraph, Ives, and others having been growing into favor in some sections, while a host of newer varieties are being pushed forward as fast as possible, with the aim of having each one placed at the head of the list.

BLACKBERRIES.

This fruit is still gathered in larger quantities from wild than from cultivated stocks, and it is still claimed by many that just as fine berries grow on the bushes of the former as on the latter. This consolation may be quite agreeable to those who depend on wild ones only, but those who have grown their Kittatinny, Lawton, and other cultivated kinds, have quite different views in the matter. One of my correspondents reports that he has shipped, as express agent, 5,000 buckets of wild berries in a season, from a few townships in Cambria county, on the summit of the Alleghenies. Evidently the wild crop, as yet, far exceeds the cultivated.

RASPBERRIES

Are but little reported, and probably the least important throughout the State of its small fruit crops. In the vicinity of large cities and towns, it it is reported as one of the best paying fruit crops, and coming, as it does, in the season between strawberries and blackberries, it is well worthy a more extended cultivation.

STRAWBERRIES

Are more generally grown than any of the small fruits. Wilson is still most popular, probably because it is best known, but Charles Downing is, in many sections, taking its place. Not a few other kinds possess some merits superior to either of the former, but none has as yet supplanted them for general cultivation. With the appearing of so many new kinds, the one to supersede the Wilson for general cultivation will doubtless be forthcoming.

CURRANTS.

Few families that own a garden have not some currant bushes, (generally the Red Dutch,) which almost invariably must make their own way among grass and weeds. When grown for market, the larger kinds are more extensively planted. Evidently, this fruit has never received the general care and attention which it deserves.

GOOSEBERRIES

Are but little grown compared with other small fruits, except by market gardeners. Their liability to mildew has prevented general planting of the large and excellent foreign kinds. The new plan of grafting on the Missouri Currant, will doubtless work a new era in the cultivation of this much neglected fruit.

BLIGHT

Has been more prevalent the past season than, perhaps, ever before, especially on pear, and, to some extent, on apple and plum. The extreme heat was by many considered the leading cause. At the same time some localities were entirely exempt. This makes it a question of importance to scientists.

NEW FRUITS.

The bringing forth and testing of new fruits continues with unabated zeal, and if the United States do not eventually supersede all other countries in their variety of choice fruits, it will not be from any want of activity in that direction. New and valuable apples are being continually brought to notice, apparently without any special effort to produce them. All that seems wanting is to disseminate them in localities to which they may be adapted. To Mr. Clapp is due the honor of introducing new and valuable varieties of pears. The same is due to Dr. Kirtland, for new and valuable cherries. To Mr. Rogers and others for a new departure in grape culture, which Mr. Ricketts has carried to such an extent as to sustain the hope of soon having some of the most valuable and delicious grapes for every section of our broad domain.

The most interesting matter that is new in peach culture is the number of varieties that are from one to two weeks earlier than Hales. Not less than a dozen kinds have recently been fruited, for which is claimed said advantage, in addition to being more exempt from rot. To the credit of Pennsylvania, be it said, that we claim at least half of the new candidates, with a fair prospect of having some of the most valuable. The day has evidently gone by for selling peach trees earlier than Hales, at $3 to $5 apiece, unless to such as do not keep themselves posted with the progress of the age.

Of insect enemies, nothing new has been reported, the old and tried ones continuing to be the burden, although it is claimed that the ravages of curculio are on the decrease. The most popular remedy against the apple and peach-borer is wire and pointed knife. Of all insects injurious to our fruits, the least appears to be done against the Codling moth, while the loss resulting from its habits is probably greater than that of all other fruit-destroying insects.

THE BEAUTIFYING OF HOMES

By ornamental planting is quite encouraging in some localities, but in the rural districts, generally, it will require many changes to bring them up to the ideal of many of our progressive men and women.

Having extendent this report beyond the usual limits to make it interesting, it is hereby submitted to your criticisms with an apology for so long occupying your valuable time.

H. M. ENGLE,
Chairman General Fruit Committee.

The report having been read, the president stated it was now open for general discussion.

Mr. Calder asked Mr. Engle's experience with the Codling moth.

Mr. Engle had but little experience, but thought its ravages could be prevented to a great extent. Hay or straw bands, are a partial remedy. Crops are saved in some sections by that method. The bands, which are tied around the stem or trunk of the tree, are removed every two or three weeks and burned, thus destroying the young brood, which finds its way there for protection. The first brood having wings, cannot be destroyed in that way. Thought Mr. Rathvon could probably suggest a way to capture and destroy them.

Mr. Stauffer had but little practical experience with the Codling moth, but he knew its habits, and had read a great deal about it. He had seen it stated, that any sweet substance placed in a dish, near a lamp or light, in the evening, would attract and destroy it. Thinks it generally does its work in the evening.

The president asked Mr. Rathvon to give a history of this moth.

Mr. Rathvon has had no experience in capturing it, but has studied its habits rather closely. After leaving the apple, the insect seeks shelter under the bark of the tree, and there becomes pupa, one of which is all ways carried over the winter. Has opened barrels in winter, and seen dozens fly out. Thinks it rather difficult to capture it when fully matured. Should always be destroyed in its pupa state. This can be done by placing bands or cloth around the trees, in which they will seek shelter. Sparrows and swallows destroy the insect, and these birds should be encouraged by fruit growers. The cat-bird, though very severe on grapes and other small fruits, destroys many insects.

Mr. Lint. The moth cannot move freely under a temperature of seventy degrees. Thinks it does its mischief mostly after night.

The President had greatly reduced the ravages of the Codling moth by tying two shingles around the tree, and removing them every two weeks, to destroy the pupa. The moth was unusually destructive last season, owing, perhaps, to the extreme drouth.

Mr. Rathvon, to illustrate the uncertainty connected with the destruction of moth, stated that on one occasion he had captured some larvæ of the celery caterpillar, and confined them in a case for the purpose of making observations. In two weeks two came out black butterflies, others did not come out for two months, and others not until the following spring. Most insects in the larvæ state can endure almost any degree of cold, while they are easily destroyed by heat. Eggs of the silkworm can be kept in the ice-house a year or more, while a high temperature will destroy them at once.

Mr. Hoopes moved that a committee of five be appointed to prepare a programme of business, and report at the evening session.

Agreed to, and Messrs. Hoopes, Carter, Brinton, Engle, and Calder were appointed said committee.

Unfinished business being next in order, the question of changing the name of the Society was taken up.

Mr. Hoopes. We are, I believe, the only organization of the kind in the United States that holds the name of Fruit Growers' Society. New York, Illinois, Ohio, and Michigan have all adopted the more general name of Horticultural Society. This title would give us a wider range of topics for discussion, and open a wider sphere of usefulness to the Society. Have, however, no objection to continuing our present name if the members desire.

Mr. Engle thought as the question has been continued from our last annual meeting, it had better be now decided one way or the other. Agreed with Mr. Hoopes, that a change of name would be desirable and advantageous, but as there is already in the State a "Pennsylvania Horticultural Society," there seems a difficulty in the way of selecting a suitable name. Would, however, suggest the name of "Pennsylvania Horticultural and Fruit Growers' Society."

Mr. Grover, a representative of the Ohio Horticultural Society, being introduced by Mr. Hoopes, stated that the Society in his State had recently changed its name from "Pomological" to "Horticultural" Society, with decided advantage, in every respect. Find we have a broader field of usefulness, and can get more people interested in our meetings.

Mr. Meehan thought there were difficulties in the way which the members had probably overlooked. The Society, some years ago, incurred considerable expense in having engraved a plate which would doubtless be a loss in case the name was changed. Another objection that might be named is the difficulty we might meet in having our reports published by the State as now. As for the greater range of topics for discussion, he thought we now introduce questions pertaining to almost every branch of Horticulture, and would not likely do more under any other title.

The question was then put, "Shall the name of this Society be changed to that of 'The General Horticultural Society of Pennsylvania?'" and it was decided in the negative.

PEACH CULTURE.

New business being next in order, the following essay was read by W. P. Brinton, of Christiana:

The cultivation of the peach in Eastern Pennsylvania, until within the last few years, has been looked upon by most of our fruit growers as being attended with a great many risks, and was, consequently, entered into with much caution by our farmers and land-holders. But latterly we have had reason to believe we can have as much success in growing peaches as we can have in growing any of our valuable fruits, if the necessary precaution is observed in selecting the proper site for the orchard. We are told by old men that in the early settlement of this part of the State, this fruit tree was much longer lived, and bore much more regular crops than it does at the present time, or than it has been doing for the last thirty or forty years. This statement may be in part true, but it is reasonable to suppose that the same conditions that made peach-growing a success then would make it a success now. And while it might be interesting to some to inquire into what changes in climate have operated, (as they claim,) to the injury of the perfect growth and development of this fruit, it would seem more practical to inquire whether we cannot, at present, make the growing of this delicious fruit as certain as ever it was, or even more so, by making a judicious selection of soil and exposure with proper cultivation.

Every plant seems so constituted that it will do better in some soils and exposures than it will in others, which are not congenial to it. This we see demonstrated in the growth of the different varieties of timber that has grown up without cultivation. On the low, heavy lands, near streams, we will find oak thrive best in this latitude. On the more elevated positions, we find the black and Spanish oaks, and on the top of our hills we find principally chestnut timber. There are some exceptions to this rule, but it is true in the main.

The peach is not a native of this country, but was brought from Persia, as its name (*Persca vulgaris*) would indicate. Almost all the trees brought here from that country do best on dry soils, and it is admitted the soil and climate is less humid than that of our own. This being the case, it would be but natural to select a soil as near like that of its nativity, and as far as the experience of the writer has gone, it has led him to the conclusion, that in no situation, save a dry porous soil, will the planter of the peach have any marked success. In selecting a site for an orchard, get as near the top of a hill as you can, where chestnut timber thrives, with a south-eastern exposure ; and, if possible, sheltered on the north and west by timber, is preferable. After having selected your site for the orchard, as directed, prepare your ground as you would for corn. It might not be amiss to say that any soil that will make a good growth of corn is sufficiently fertile for the peach. Space your ground so as to leave the trees stand about sixteen feet each way. Planting the trees almost any farmer can do, but deep planting should always be avoided, for reasons too obvious to mention. The selecting of varieties is a matter about which there is much diversity of opinion. although it is well known that some varieties, as far as productiveness is concerned, are much to be preferred to others. The space between the trees can be planted with potatoes the first year, the second year it can be planted in corn; after which it will not be profitable to plant any crops, as the trees will shade the ground so much that growing crops between the trees will not pay. A rigid watch should be kept for the borer, twice a year, in May and October. Every three should be examined, and if the borer has found a lodgment, he should be removed and killed, as many trees come to an early death from this alone. As to the cultivation of the orchard, there is some difference of opinion, but it is safe to say that the orchard should be cultivated as long as it is an orchard, and it should be done early in the season. Would not recommend cultivating after the middle of July. If you cultivate late in the summer, you are apt to induce a late growth that will not mature, and the consequence is, if a severe winter follows, your orchard will be injured.

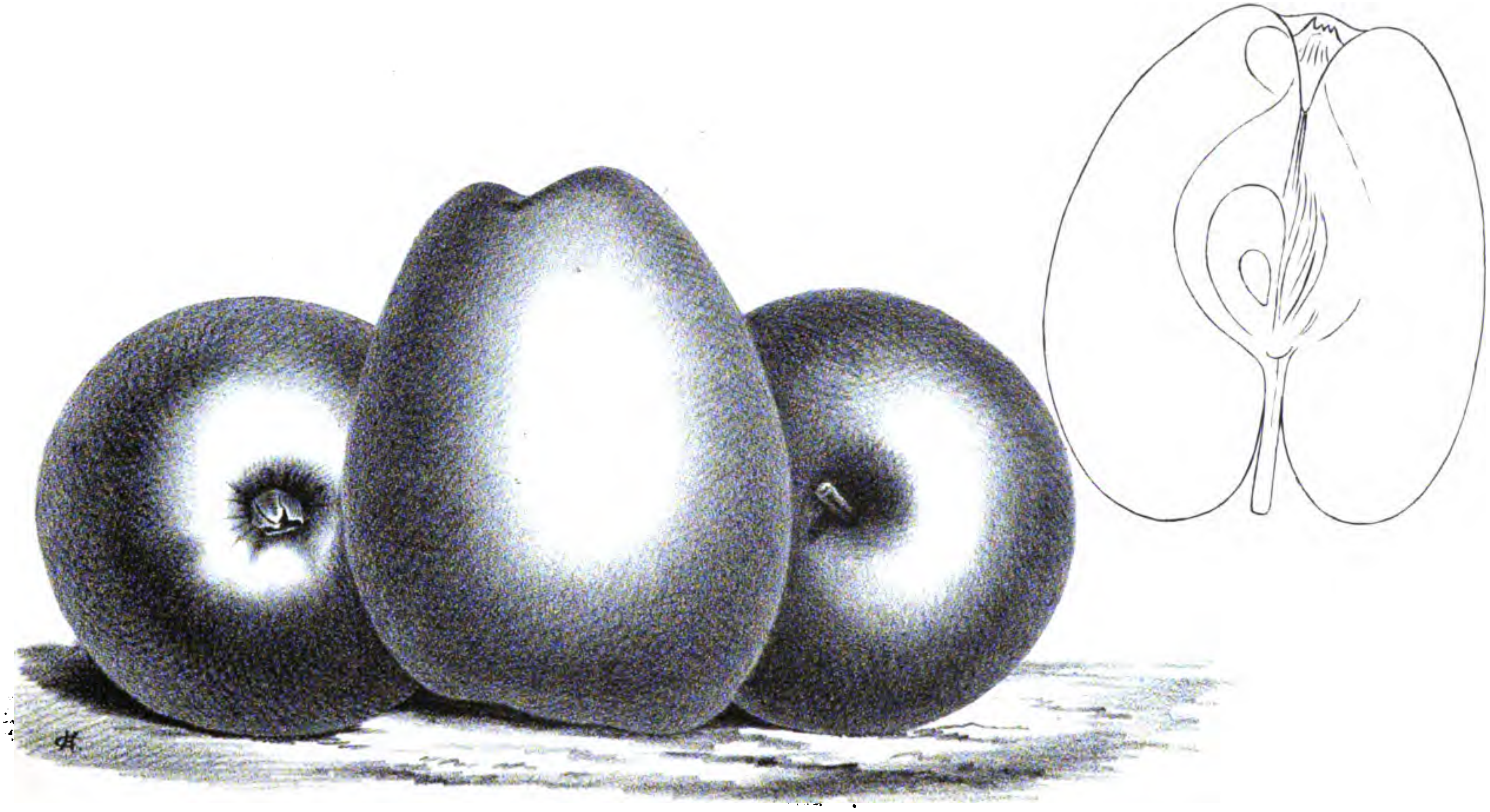
There are thousands of acres in Eastern Pennsylvania that could be cultivated in growing peaches to better profit than in any other crop, and instead of us paying out thousands of dollars annually for this fruit, brought from Maryland and Delaware, we as easily, by judicious selection of situation and proper cultivation, could make this branch of fruit culture a paying crop, that would add largely to our marketable products, and be a source of revenue to this section of the State.

The subject being before the Society for general discussion, Mr. Calder, President of Pennsylvania Agricultural College, inquired of Mr. Brinton why he recommended that peach trees should be planted on high ground, and why they should not be planted deeply. In an audience like this there were, doubtless, some who would advocate deep planting.

Mr. Brinton stated that the chief reason he had to offer was that peach trees grew better when planted shallow, and that they had always succeeded best with him when planted on high ground. Some varieties of trees, like quinces for instance, will form new roots if planted too deep, but peach will not. He was aware that in Delaware and New Jersey peaches thrive well on low and level ground, but in our own State, experience has proven that they succeed best on elevated positions.

Mr. Reist also favored shallow planting, and stated that his experience coincided with that of the essayist. The roots should be near the surface.

Mr. Brady thought the reason many persons failed in growing trees was because they were planted just as they came from the nursery. Holes should be two feet square, trees not planted too deeply, and all side branches as well as top be trimmed off when planted. Less sap was thus required to nourish the tree, and it will be better prepared to bear drouth and heat. Such was his experience with trees, and he had always been very successful.



Millport Sheepnose.

Mr. Stauffer also advocated shallow planting. Trees are more likely to get nourishment from the soil when roots are near the surface.

Mr. Meehan inquired why Mr. Brinton advocated cultivating peach trees early, and why he disapproved of cultivating late.

Mr. Brinton. Late cultivation is apt to induce late growth, which does not fully ripen, and is often winter-killed in consequence. Would not cultivate after July. It is an established fact, that late culture induces late growth.

Mr. Engle compared the young peach orchard to a crop of corn. If neglected, will not continue to grow thriftily. Thought it a mistaken idea to plant trees deeply to avoid being blown over by winds. If planted shallow, trees will form surface roots which will brace in every direction.

Mr. Grover. Nature sets a good example in this respect, and one which we can safely follow. Plant about as deep as young trees grow when they germinate spontaneously.

Mr. Hiller. Could in the main agree with the essayist. Years ago, in Manor township, Lancaster county, peaches were seldom known to fail. They seemed to grow spontaneously, and more than could be utilized. Now they cannot be grown in that section with any success. The soil is limestone. Live now in Conestoga township, where soil is more gravelly and more rolling, and grow peaches quite successfully. Have had good crops of peaches of late years, though on low grounds are more apt to fail. Trees are not long lived, but are not much subject to yellows. There is no apparent climatic change. We formerly raised as many cherries as we wished, now we can only grow them on high ground. Don't pretend to understand the subject.

Mr. Hoopes. Deep planting is one of the great evils which nurserymen have to contend with. Most raspberries, if planted deeply, will die, while if roots are merely covered would grow.

Mr. Lint related his observations with deeply planted trees. Took out old stumps that had been planted twelve to fifteen inches deep, and found that the roots had first grown upward and then outward from the tree. Plants only deep enough to get proper moisture.

Mr. Meehan. It is well known that he thinks cultivating at any time is an injury. When roots are disturbed, plants or trees have more difficulty in getting moisture. Thinks fruit growing would be more successful and profitable if general cultivation were abandoned. Has planted on a hill an orchard of apple, peach, plum, and pear, and during the past two or three years trees have been laden with fruit. Allows the grass to grow and the soil to remain undisturbed. Trees are healthy and vigorous.

Mr. Engle. It is said that the best and most successful peach-growers in Delaware and Maryland usually cultivate. Asked Mr. Sands, of Baltimore, what the practice was in that vicinity.

Mr. Sands. The custom there is to cultivate almost continually.

Mr. Carter thinks all practical testimony is against the theory of non-cultivation. Has seen sufficient evidence in a pear orchard, in which part of the trees were cultivated, and part left in a tough sod. The former grew far more thrifty and healthy than the latter.

Mr. Lint has grown as fine peaches of Stump and Old Mixon varieties in sod as he has grown anywhere. Had some specimens nine inches in circumference, and of excellent flavor. These were grown on high slate soil· Others, grown on lower ground, bore but little fruit.

Mr. Hoopes is a believer in Mr. Meehan's theory. No one cultivates more thoroughly than Mr. Meehan. Top-dressings of grass and fertilizers cost as much as cultivation.

Mr. Harvey thought one important branch of peach culture had not yet been discussed. Referred to the planting of unhealthy seeds, and propagating unhealthy buds. Some nurserymen deserve censure for not carefully guarding against these means of disseminating the yellows. Thought yellows were caused by severe cold. In the Southern States the disease is unknown.

Mr. Grover. Yellows not very destructive in Ohio. In Michigan and Northern Ohio, extreme cold winters have destroyed some orchards. One orchard, near Frederick, Md., has lost many trees by this disease, while a neighboring orchard, about half a mile away, but on ground one hundred feet higher, has not been touched.

Mr. Meehan. Don't know where the idea originated that there is no disease of the peach South. Saw, near Canton, Miss., whole orchards that had been destroyed. Cannot say it was yellows, but the symptoms were similar, and the result equally destructive.

Mr. Lint has not had on his place a tree to die of yellows in six or eight years. Anything that takes potash out of the soil, will induce yellows.

The President inquired of Mr. Brinton what varieties he would recommend, as best suited to our soil and climate.

Mr. Brinton considered Old Mixon Free the best for mid-season. Has had no experience with the new early kinds. Troths, Early York, Stump the World, Old Mixon Free, Late Crawford, Smock's Late, and Ward's Late are the leading varieties in his collection. Has not fruited Mt. Rose.

Mr. Hiller. Has about seven hundred trees, ten years in bearing, consisting of some twelve varieties. Early Rareripe, Old Mixon, Late Crawford and Smock's Late are the leading and most profitable kinds. Three years ago, sold $800 worth from his trees. Some varieties did not pay cost of picking and marketing. One hundred trees each of Late Crawford and Old Mixon yielded more than the other varieties. Has not fruited Mt.

Rose nor Salway. Has one hundred trees of Hale's Early, from which he has not realized more than $40. Early Crawford almost worthless, not ripening its fruit properly. Ward's Late nor Susqueshanna never amounted to anything.

Mr. Calder. Because some varieties are worthless on Mr. Hiller's grounds, we must not conclude that they are so elsewhere. The Susquehanna, for instance, which fails in many localities, is an abundant bearer, and one of the most desirable varieties in the vicinity of Harrisburg, where it originated. It is a seedling, found on the banks of the Susquehanna, by a lad named Griffith, who took it home, and carefully planted it. It is very large in size, of most excellent flavor, and, in that locality, the leading variety for house-yards. Hale's Early is not desirable, on account of rot.

Mr. Thomas. In many parts of Michigan, Hale's Early is one of the best and finest varieties they grow. Does not seem subject to rot, as in this State. In the vicinity of Philadelphia, Ward's Late is one of the most profitable varieties grown.

Mr. Small. Has had some experience with Susquehanna, outside of the city of Harrisburg. Planted twenty-five trees about ten years ago, which grew finely, but never produced twenty-five cents' worth of fruit.

Mr. Hiller thought we fail more from not knowing what varieties to plant. than from general causes. So, also, with apples. We plant Northern Spy, Baldwin, and Greening, and have no fruit. We have York Imperial, not a very extra fruit, but a sure crop in Lancaster county. The Susquehanna peach seems well adapted to town lots, but is nowhere in orchard culture.

Mr. Engle has had similar experience to that of Mr. Hiller. Would not plant any early varieties of peaches, except *very early*. Never could make money out of Early Rareripe. Early Crawford did better, especially when not left to overbear. Old Mixon and Stump the World come at the best season for profit, and always command a good price on account of fine quality and appearance. One valuable feature of these two varieties, is that they have not that tendency to overbear, so common to some kinds. Late Crawford is one of the most valuable varieties. Ward's Late is not reliable. Smock's Late does well. Although late, we generally realize as much from it as from any other variety. It is one of the best canning peaches. Thinks Salway a valuable acquisition. It is similar, in habit of growth, to Smock's Late, but from four to seven days later. Would plant largely of Salway. Susquehanna too shy a bearer for profit. Gave it a fair trial in York county, on high ground, but to no purpose. Reeve's Favorite is a fine variety, and would plant a good proportion. It is larger than Late Crawford, but not so good a bearer. It is one of the handsomest and most saleable varieties we have.

Adjourned to 7 o'clock, P. M.

EVENING SESSION.

The Society re convened at the appointed time, and was called to order by the president.

The committee appointed to prepare a list of subjects for discussion, during the several sessions, submitted the following:

SUBJECTS FOR DISCUSSION.

1. Blackberry Culture.
2. Fruits at the Centennial.
3. Experience in Fruit Culture at College Farm.
4. Noxious Weeds.
5. Science in Horticulture.
6. Forest Culture.
7. The Apple-Borer, and its Destruction.
8. The Construction of Cheap Fruit Rooms.
9. Best Trees for Wind-Brakes, and are they Really Beneficial to Fruit Culture?
10. Insect Longevity.
11. Best Methods of Preserving Winter Vegetables.
12. Best Varieties of Potatoes, and Methods of Cultivation.
13. Beautifying Homes.
14. Reading communications, and remarks thereon.

The following communications from absent members and others interested in horticulture, were read by the secretary:

WASHINGTON, D. C., *December 30, 1876.*

E. B. ENGLE, Esq., *Secretary, &c.*

DEAR SIR: I have been so much engaged with Centennial matters, that I only now reply to yours of the 22d.

I am now busy closing up and getting home our exhibit, (which will occupy all my leisure for several weeks yet,) that I cannot promise myself the pleasure of attending your meeting on the 17th January, 1877.

If I can, I certainly will endeavor to be present, as I always enjoy the meetings of the Pennsylvania Fruit Growers' Society; but I fear that it will not be practicable at this time.

Yours, very truly,

WILLIAM SAUNDERS.

1013 CHESTNUT STREET, *December 8, 1876.*

E. B. ENGLE, *Secretary, Marietta, Pa.*

I shall be unable to attend the convention of our Society this year, and have explained to President Satterthwait why I cannot accept your kind invitation to prepare an essay for the occasion.

Respectfully yours,

A. W. HARRISON.

GEORGIA STATE HORTICULTURAL SOCIETY,
AUGUSTA, *December 18, 1876.*

E. B. ENGLE, Esq., *Secretary Pennsylvania Fruit Growers' Society, Marietta, Pa.*

DEAR SIR: I have your favor of 15th, with request to send you an article on New Varieties of Peaches, to be read at the next meeting of your Society. In reply, will say that I will take pleasure in forwarding you a short report on the new varieties, so far as fruited with me. The past season was unfavorable to our peach crop, many varieties, of which Alexander and Amsden were among the number, failed to fruit. Other varieties gave some remarkably fine specimens.

Respectfully yours,

P. J. BERCKMANS.

WASHINGTON CITY, D. C., *December 23, 1876.*

Mr. E. B. ENGLE.

DEAR SIR: Your regarded favor of the 15th came duly to hand, and delayed answering to see if I could avail myself of your kind invitation to attend your meeting, in Lancaster, on the 17th inst. I find, however, this season it will be quite out of my power. Neither shall I be able to get up a paper for this meeting. Thanking you and the Society for the honor of your invitation,

I am, with much respect, yours, &c.,

JOHN SAUL.

INDIAN RUN, MERCER CO., PA., *December 28, 1876.*

E. B. ENGLE, Esq.

DEAR SIR: Yours of the 21st is at hand. I don't feel able at present to comply with your request, to get you up a short essay, &c. Have been suffering for some four weeks past with a very severe attack of rheumatism, that has left me in a debilitated condition, not able to leave my room, but am recovering slowly for some two or three days past. If I recover my usual health again, as I hope I may, at some future time, may give you some of my experience in the fruit and tree-growing business.

Yours respectfully,

JAMES A. NELSON.

HUGHESVILLE, PA., *15th January, 1877.*

E. B. ENGLE, *Secretary, &c.*

We have some seedling varieties of apples worthy of our notice, and ought to be introduced. Our "Hughesville Farmers' Club" have been offering premiums for the *best* seedlings, and also for the best and largest display of seedling apples, and found many fine specimens. Over seventy varieties were exhibited. Other exhibitors had in the display over sixty varieties of grafted specimens. We are disappointed with the Tompkins Co. King Apple; rots badly on the tree, and does *not* suit this locality. The Baldwin, Rhode Island Greening, Paradise, Belleflower, Hoopes, Wagener, Smoke-House, and Northern Spy are productive. The Spy and Smoke-House want the top well opened to have fine fruit. The Spy does not keep as well as either of the other varieties. All things considered, the Smoke-House is our most profitable apple for home uses; bears every year abundantly, and fit for use all winter.

We had over one thousand bushels this last season. Keep them in the cellar, and bury in the ground. They keep well.

Respectfully,

B. MORRIS ELLIS.

On motion of Mr. Grover, the discussion of Peach Culture was resumed.

Mr. Calder inquired whether there was any rule governing the length of time a member was allowed to speak. On being informed that there was not, he moved that any member be allowed ten minutes, and not to speak more than once on the same subject, without unanimous consent.

After being amended, so as to change the limit of time to five minutes, the motion was adopted.

Mr. Meehan stated in regard to early varieties of peaches, that Hale's Early, E. York, E. Tilotson, and Troth usually follow each other in ripening, though last season all seemed to ripen at once. Soil and the condition of the season should be considered before recommending or condemning any particular varieties.

Mr. Thomas had seen a statement in an English paper that Hale's Early ripens in England earlier than Early Beatrice, Rivers, &c., while in this country it is somewhat later.

Mr. Lint had noticed a tree on his farm on which part of the fruit ripened two or three weeks earlier than the rest.

Mr. Meehan. This often occurs where trees are diseased, or where the vitality is weakened.

Mr. Engle. Thought Mr. Lint might expect yellows on his premises in a year or two. Finds it a certain sign of yellows to have fruit ripen prematurely. Thinks "Mountain Rose," an early peach of much value. Will, no doubt, supersede "Troth," being much larger.

The President indorsed Mr. Engle's opinion of the Mountain Rose. Considers it one of the most beautiful of peaches, and an abundant bearer.

Mr. Hiller inquired about Early Beatrice and Mr. Engle's new seedlings.

Mr. Engle has not fruited Beatrice nor his own seedlings, except on the original trees. Has fruited Alexander, and finds his own (Downing) to be a week or more earlier.

Mr. Calder asked the experience of members in pruning. Finds that at the Agricultural College Jack Frost usually did so much pruning that he prefers waiting until he is through. In the spring he generally cuts back half or two thirds of previous years' growth. It seems to avoid a tendency to overbearing, and certainly adds to the beauty and symmetry of the tree.

Mr. Lint concurred in Mr. Calder's views on the subject of shortening in. Had tried close pruning, with entire success.

Mr. Grover cited J. J. Thomas as saying that no tree needs more pruning than the peach, and none is more neglected.

Mr. Bissell advocated pruning, but thought that to cut away one third of previous years' growth was quite enough.

The President thought it well to shorten in, but seldom did so, because of the amount of labor. Has three or four hundred peach trees, about six years planted, and finds them profitable. Has peach and apple planted alternately in the same row, and prunes off the side branches, giving his trees a fan-shaped appearance. Is thus enabled to cultivate and grow crops close up to the trees.

Mr. Meehan remarked that under certain circumstances pruning would be injurious, under others beneficial. If trees have a good soil and a luxuriant growth, was satisfied that they need not be much pruned, if any, but if they be sickly, or of low vitality, season hot and soil poor, pruning would be advisable. Pruning depends on circumstances and conditions, requiring good judgment as to when and with what trees it should be done.

Mr. Brinton asked Mr. Meehan's opinion in regard to yellows. Has heard of peach trees having yellows and recovering entirely.

Mr. Meehan had no personal experience. Stated that Professor Wood, of the American Philosophical Society, had treated trees thus affected with a heavy dressing of potash, which resulted in their recovery. In his opinion, yellows were caused by parasitic fungii, and are readily imparted to other trees by the knife or by spores being blown from a sickly to a healthy tree.

Mr. Engle asked what degree of cold peach trees will bear without being injured in the bud.

Mr. Bissell answered that ten degrees below zero would kill them.

Mr. Hiller. That depends upon circumstances. If would be well ripened and in good condition, will bear twelve degrees on high ground without injury.

Mr. Bissell. Much depends, also, upon the condition of the buds. If well advanced, will be more likely to be injured.

Mr. Engle. Has seen it stated that in Michigan peach buds will bear fifteen degrees below zero without injury. Such was not the case in this State, at least not in his experience.

Mr. Gover. The lake winds doubtless have a tendency to neutralize the effects of cold. On Lake Erie the result is similar.

Mr. Bissell. A great deal depends on the kind of weather which follows extreme cold. Cloudy weather is favorable, while a bright hot sun is the reverse.

Mr. Meehan stated that recent scientific discoveries had proven that light had considerable influence in the destruction of trees and plants. Read in *Silliman's Journal*, a paper by Professor Asa Gray, showing that in cold countries, with less sunlight, vegetation will endure a greater degree of cold. Light increases evaporation, thus more or less injuring the tree.

Next in order was an article on blackberry culture, by Mr. Parry, of New Jersey:

BLACKBERRY CULTURE.

The blackberry occupies an important position in the list of small fruits, commencing to ripen close upon the season of the raspberry, and before peaches and grapes. Its easy culture, hardiness, and the high price at which the fruit sells, makes it one of the most profitable fruits to grow. It is not particular as to the soil and location. There is no advantage in selecting the best land for a plantation, as the canes would there grow so large and tall as to require much time and expense to prune, trim, and keep them within bounds. They need but once planting, as the bushes renew themselves annually thereafter, by sending up a spontaneous growth of young suckers to bear fruit the following year, and with an occasional dressing of manure, they will continue to give large returns for many years. We planted ten acres of them on thin sandy land, which bore good crops of fruit for thirteen years, yielding several times 650, 700, and once

800 bushels of fruit, while land adjoining, equally good, planted with corn, did not produce more than half the number of bushels per acre. When the corn was removed, all was gone. To get another crop, we had to manure and plant again. But not so with the blackberries, for we only pick the ripe fruit and leave the foliage to fall on the ground and add to its fertility. The plants being permanently established, the annual crop of fruit taken off may be compared to the coupons taken from Government bonds, the principal remaining to produce more.

How Long Will They Last?

Blackberry plantations propagated from the cuttings of healthy young roots, will continue to yield good crops twelve to fifteen years, and with proper care may last much longer. But as the roots become old and decayed, the suckers come up spindling and feeble, producing but little fruit, and it is found to be more profitable to start a new plantation on fresh land, and destroy the old one by plowing and planting corn or other crops, and for a few years sucker plants will continue to grow from the mutilated, sickly, and decaying roots left in the ground. These are frequently sold to planters, at a lower price than thrifty young plants, propagated from healthy root cuttings, could be afforded.

But the best results are obtained from young, healthy plants, grown from root cuttings, especially for the purpose. All of our plantations, propagated from young roots, and transplanted to the field, have made an even stand, and done well, while others planted with suckers, from old and decayed patches, are badly missing, presenting a ragged and uneven appearance, yielding but little fruit.

Yield per Acre.

At the average price, at which blackberries have been sold in market for fourteen years past, a field, with ordinary treatment, should yield from $200 to $300 per acre, and, in some cases, $500 per acre have been realized, and, as it is from the net annual dividend received that the real worth of an investment is to be ascertained, we can readily arrive at the true value of a plantation of the best selected blackberries.

What Kind of Land is Best.

Having experimented on several kinds of soil, from a firm clay to a light blowing sand, we prefer, as the most favorable location for blackberries, a light, moist, sandy loam, well under-drained, if water would otherwise stand near the surface. Formerly, we thought that low, rich land would be best, judging from the large growth of briars along the ditches and swampy places. Accordingly, one of my neighbors planted ten acres of low, dark, rich land, that had produced heavy crops of corn and timothy, expecting to get a corresponding one of blackberries; but, in this, he was disappointed, except in growth of canes, which were very large and strong, but not well ripened before winter set in, and, consequently, were greatly injured, and sometimes entirely killed before spring, yielding but little, or no fruit; while blackberries, planted on thin, higher land, not worth near so much for agricultural purposes, producing small canes, with buds well developed, and the wood matured before the approach of winter, would yield heavy crops of fruit.

In walking through our patch, when loaded with berries, he remarked that he could not understand why those small bushes had so much more fruit on them than his large ones. I attributed it to the fact that the canes and fruit-buds were better ripened the fall previous, and had stood the cold of winter with less injury.

Model Blackberry Bushes.

Another farmer, near by, having forty acres devoted to the culture of blackberries, purchased a tract of light, sandy land, at $13 per acre, and planted it with them. But, desiring to have a model patch, he purchased a few acres of the richest and best land for ordinary agricultural purposes, in the vicinity, at $300 per acre, and planted it with the same kind of blackberries, giving the best treatment and special attention, which produced an enormous growth of canes; but which never yielded as much fruit, per acre, as the $13 land.

He remarked to me, while looking at them, that "we have learned something since commencing this business." To begin now with the knowledge we have, the error of planting our best land with blackberries might be avoided.

Preparation of the Ground.

The land should be plowed and harrowed smooth; then open furrows, in the fall, at a distance of eight feet apart, and, if muck can be had conveniently, it is valuable to spread along them during winter, leaving it exposed to the action of the frost. Early in spring, set the plants about three feet apart, requiring 1,815 plants to an acre. The intervening space, while the plants are small, need not be lost, but corn, potatoes, or other vegetables, may be grown midway between the rows, for the first year or two. The roots will mostly follow along the row, to feed on the muck, and grow more vigorously than lateral or side roots.

Hence, the strongest and best plants will come up, nearly where they are wanted, to produce fruit the following year. But they should not be left to stand along the rows closer together than an average of one plant to a foot in length, in the rows. The plantation should be gone over several times during the summer, and the tops of the young canes, as they appear above the bearing bushes, should be shortened in, so as to keep them at a uniform height of about three to five feet, according to their strength.

This will induce the side branches to grow vigorously, and develop fruit buds, near the ground, and, interlocking with each other, the bushes will support themselves, and thus avoid the necessity of stakes and wires, to prevent high winds from injuring the tender canes. The side branches should be shortened, in the following winter or spring, to a pyramidal form, somewhat resembling a dwarf pear tree, when properly trimmed. Plants thus treated will yield more fruit, and of better quality, than if left to grow tall and slender, as, by nature, they are inclined to do so.

We have, sometimes, left a few rows without pruning, and others pruned but little, which fully illustrated the great importance of shortening in the branehes. The unpruned bushes would bear more fruit than could be ripened on them. It would remain red a long time, and, finally, dry up, being of no value. The best and earliest fruit would be on the bushes, well pruned, so as to throw the whole strength of the roots into fewer berries.

Price of Berries.

Blackberries have sold readily, for several years past, at from twelve and a half to fifteen cents per quart. They will be likely to sell well for many years to come, as they can be used in so many ways, and the demand will increase with the supply. Some patches will be planted on unsuitable soil, and will not pay cost; others, in the most favorable locations, will be suffered to grow at random, becoming large and rank, and producing but little fruit.

How to Raise Bountiful Crops.

To insure good crops, requires close attention; the canes should be kept thin, and well headed back; and, on poor land, an occasional dressing of manure, muck, or fertilizer of some kind, adds to the quantity and quality of the fruit.

There is no necessity for the market to be overstocked with the fruit, as it pays well to make it into wine. Three quarts of blackberries, and three pounds of sugar, with the addition of a little water, will make a gallon of excellent wine, highly recommended for its medicinal properties; worth two dollars per gallon, while new, and its value increases with age.

All the poorer berries, those that are too ripe to ship to market, may be properly converted into wine, at home; and only the finest and most perfect fruit sent to market, which will always command a fair price.

What Kinds to Plant.

Having tested over thirty varieties of blackberries, besides many seedlings, of our own growing, we would name, as those which are best established, Wilson's Early, Dorchester, Kittatinny, and New Rochelle.

The *Snyder*, more recently introduced, is remarkably hardy, a strong, vigorous grower, very productive, though rather small, compared with several of the preceding varieties, yet, being hardy and productive, may always be relied on for a full crop of fruit.

The *Hoosac Thornless*, so highly recommended, on account of having *no thorns*, may be rated with Dodge's Thornless, Newman's Thornless, and all others, of that class, which have no other merit, their fruit being too insignificant to claim attention.

The white, red, and purple blackberries, such as Crystal White, Colonel Wilder, and Doctor Warder, all novelties, in their way, but of no practical value, in point of profit to fruit growers, have been discarded.

Clarkson's Early, of which I received a box of ripe fruit, on the 27th of June, a few days before Wilson's were ripe, may prove to be a valuable variety. Bush, an upright grower, of medium size, and very productive. Berries, fair size, being three fourths inch in diameter, or over two inches in circumference; ripen uniformly together, the whole crop coming off in a short time.

Like the Amsden, Alexander, and Beatrice peaches, their great value consisting in their earliness. Being first in market, gives an increased value to any good fruit.

We have a seedling from the Wilson, quite equal to its parent, in earliness, size, and other good qualities, and, being at least twenty-five years younger, or a quarter of a century later, since it started from the seed, will be likely, by having a more vigorous constitution, to resist the attacks of insects, which probe the canes, causing enlargements, and obstructing the flow of sap, and to escape the fruitless double blossoms, so abundant on the old and weakly Wilson bushes.

The *California* blackberry, with its long, mulberry-shaped fruit, very early, sweet and delicious, would be a great favorite, if the canes would endure our climate, but, being only half hardy, they must be protected through the winter, which will be a serious drawback to its extensive cultivation in this vicinity.

It sends up no suckers, but propagates by tips, same as Doolittle raspberry.

The *Delaware*, a seedling from the New Rochelle, is very large, and an excellent blackberry, ripens with the Kittatinny. Bush, a very strong, vigorous grower of the largest class, and appears to be perfectly hardy.

The *Sable Queen*, *Sinclair*, *Holcomb*, *Cumberland*, and many others, that we have fully tested here, were not found to be equal to the four varieties first named, and were discarded.

ORIGIN OF THE MOST VALUABLE VARIETIES.

It is worthy of notice, that all the most valuable varieties, in cultivation, have been found growing wild, and were selected and saved on account of their superiority over others; and, from thousands of seedlings raised, none have yet proved superior to their parents.

May it not be attributed to the fact that sufficient care has not been taken to mix the pollen of different varieties?

Having grown seedlings for many years, without favorable results, we have now adopted the plan of planting some of the best varieties, near each other, and drawing the branches of different kinds together, and tying them with tarred rope yarn, so as to ensure the admixture of the pollen of many flowers, thereby combining qualities in their seedlings, which could, in no other way, be found in the same fruit.

If as much care and attention were bestowed in selecting and propagating new seedling blackberries, as have been with the strawberry and grape, we might yet obtain varieties, even superior to those that are now cultivated.

YIELD AND PROFIT.

The yield and price of blackberries varies, like other fruit crops, with the surrounding circumstances. We have known some plantations to yield, annually, $400 per acre, and upwards, for several years in succession, while others, did not pay more than half that amount. Having kept a record of the yield and sale of our blackberries, for fourteen years past, we find the average to be about as follows, viz: Price, fourteen cents per quart, and yield 2,200 quarts per acre, which gives the following results:

Commission, at 10 per cent., ...	$30 80
Picking 2,200 quarts, at 1½ cents, ...	33 00
Use of boxes, ...	10 00
Pruning, cultivating, &c., ...	34 20
Net profit per acre, ...	200 00
Gross sales, 2,200 quarts per acre, at 14 cents, ...	$308 00

Sometimes we hear of extravagant reports, calculated, from the product of a small lot, up to what ten or twenty acres, under similar circumstances, would yield. A safer rule is, to take the acres, and see what they have produced. By reference to the report of the West Jersey Fruit Growers' Association, who appointed committees to collect the returns from all the fruit growers in the neighborhood, it will be found that 776 acres of land, in strawberries, raspberries, and blackberries, produced the sum of nearly $200,000, or about $250 per acre.

The cultivator of blackberries should always have strawberries and raspberries to precede them, as the same pickers, crates, and baskets will serve for all, and there is less difficulty in keeping the pickers to finish up the raspberries, where there is a field of blackberries ready to enter when the others are done.

WILLIAM PARRY,
Pomona Nursery, Cinnaminson, New Jersey.

President Satterthwait invited discussion on the paper just read.

Mr. Hoopes thought Mr. Parry had left nothing to be said.

Mr. Hiller has not tried blackberry culture to any extent. Of his Lawtons, two thirds froze; the Kittatinny was subject to rust, and Wilson's Early has proven a poor bearer.

Mr. Hoopes thought Mr. Hiller's soil was too rich.

The President thought it still a question, whether blackberries can be grown profitably in Pennsylvania. Wilson's does well where it can be induced to make canes. It is a poor plant, and often fails to make suckers. Had to go to New Jersey for plants. Hope we will yet find a variety that will do well in this State.

Mr. Lint finds that blackberry culture depends more upon soil than anything else. Finds no difficulty in growing canes, but gets no fruit.

Mr. Calder had some experience, at the College, in the cultivation of the blackberry. Had a fine crop of Lawton's one season, part of a crop another season, and that had been all, in a period of six years. His method of culture and training was the same as Mr. Parry's. Cuts away the old canes, when done bearing, and destroys them. Prunes bearing canes to about four feet in height, and laterals to eighteen inches. Thinks the blackberry a very desirable fruit, and all should cultivate it who can. Thinks wine about the worst use to which this fruit can be made, and hoped the Society would discountenance it entirely. He felt safe in saying, that blackberry wine was not good for the mind, body, or soul; it entailed misery here and hereafter, and he thought it wrong to abuse God's best gifts, by putting them to such use as would make men wretched on this world, and in the next.

Persons should not be misled by Mr. Parry's success. Easy access to good market is the one important consideration. While Mr. Parry could find in New York and Philadelphia a demand for hundreds of acres of this fruit, he could not find sale for ten acres in Centre county. Thought that in giving our experience in fruit culture, we should of our losses and misfortunes, and the difficulties we have encountered.

Mr. Carter has had no favorable experience with the blackberry. Can grow canes, but no fruit. Thinks his soil is too strong.

FRUITS AT THE CENTENNIAL

Was the subject of some very interesting and extended remarks, by Thomas Meehan, editor of *Gardener's Monthly.* To an audience like this, he thought it unnecessary to refer to the great fruit interests of the United States. Every steamboat and railroad line is freighted with fruits. Ships from the South bring their cargoes of fruit to the North, and those from the North transport it southward. We are known every where as a fruit-growing and fruit-eating people. It is not to be wondered, then, that fruit growers looked forward to the "Centennial," to learn what had been accomplished in the last century. At first, all were doomed to disappointment at the meager display. It was thought remarkable that the first exhibit of fruit should come from far-off Australia. Then came Michigan, with her wonderfully preserved apples from the previous season. All looked for Pennsylvania fruit to come forward, and there were continued expressions of disappointment and regret.

The question, met us continually: Where is Pennsylvania? Where are her fruits? And it was mainly through the efforts of Lancaster county fruit growers, that an exhibit was made, though it fell to the lot of our worthy president to make the first exhibit of strawberries. Lancaster county did honor to herself and the State, for she saved the reputation of the latter, with her centennial fruit exhibits. It was eminently proper, therefore, that he should address his remarks, on "Fruits at the Centennial," chiefly to a Lancaster county audience.

Referring, in the first place, to strawberries, he stated that only a few old English varieties were grown here, until about sixty years ago. About twenty-five years ago, Hovey's seedling was introduced, and marked a new era in strawberry culture. Still later, through the discovery of Pistillate varieties, by Mr. Longworth, of Cincinnati, its culture received a new impetus. Finally Wilson's Albany seedling was introduced, and, although twenty to twenty-five years under cultivation, it is still one of the leading and most profitable varieties.

Although new varieties of currants have lately been introduced, the old "Red Dutch" was one of the best exhibited. It is now over two thousand years old, having been propagated, continually, from cuttings.

In blackberries, there seems to have been less improvement during the past century, catalogues, of thirty years ago, making no mention of cultivated varieties. First came the Lawton, then Dorchester, then Kittatinny, then Wilson's Early. In the cultivation, or improvement of the blackberry, little, or nothing, seems due to horticultural skill.

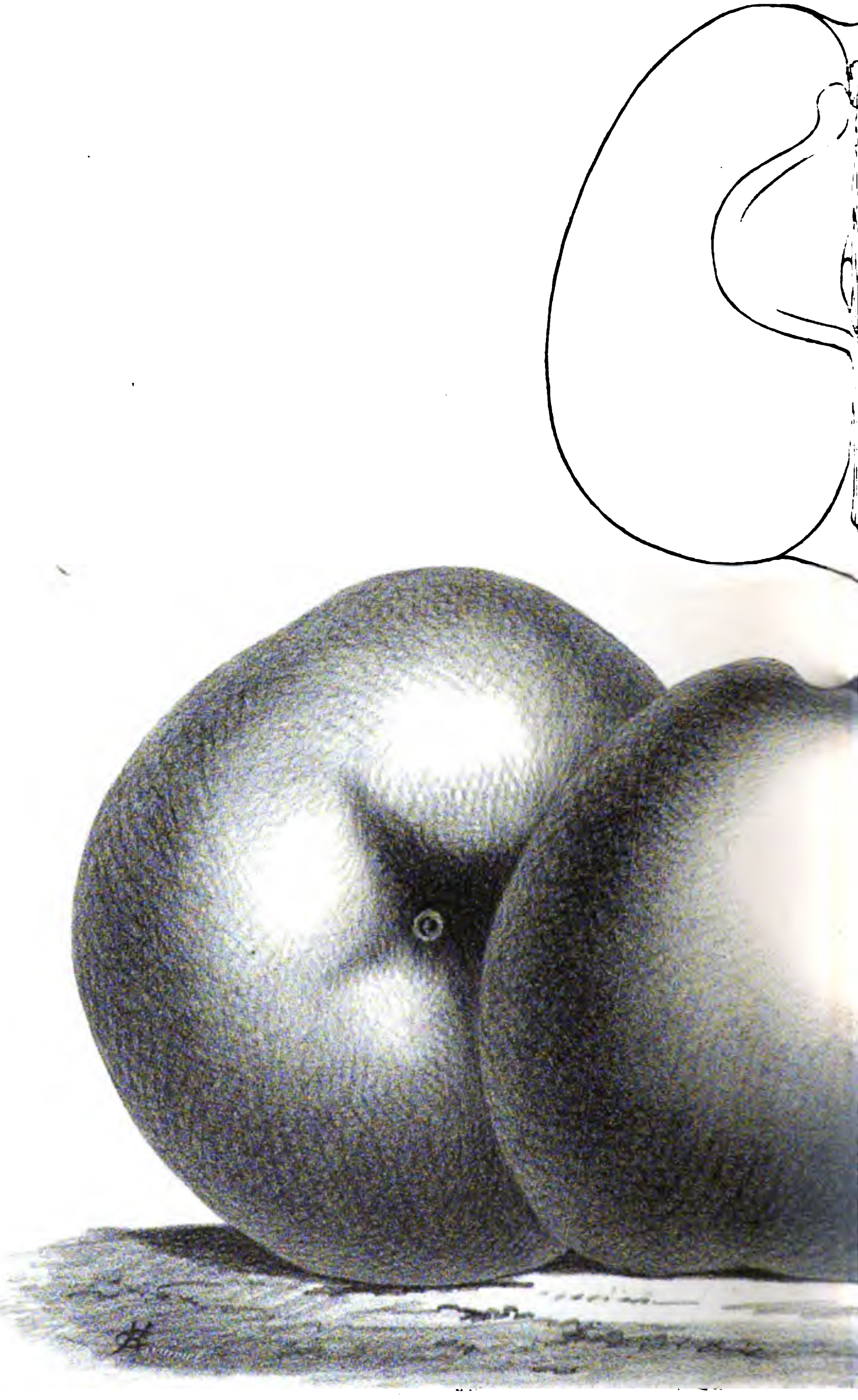
The raspberry has made considerable advance during the century, though not with marked success, until Doctor Brinckle, of Philadelphia, about thirty years ago, made great improvement in the Antwerp variety. It did not seem to become popular, until after the introduction of our native varieties, Belle De Fontenay being about the only foreign variety of note. There has, also, been some attention paid to the Black Cap varieties, which promises good results. With one exception, there has been but little improvement in this direction.

The gooseberry does not seem to have been much improved, though several attempts have been made in that direction. Downing & Smith's Improved are ahead of old native varieties, in size, but hardly superior in flavor. From Canada, foreign varieties, of enormous size, were exhibited, but, as these kinds are taken south, they are subject to mildew, unless protected by shading, or well mulching the ground.

Of peaches, there were few exhibits, but some remarkably fine specimens. Canada contributed the largest, having some eleven to twelve inches in circumference. The size of these peaches was remarkable, there being none like them from any section of our own country. New Jersey and Delaware, also, exhibited fine specimens. There has not been much improvement in the peach in the past century. Those of best quality were among the oldest varieties. Old Mixon was one of the best. There have been many popular new varieties introduced lately, whose great merit consists in early ripening, coming in at some peculiar season, but with that exception, there has been no improvement.

In the pear, there has probably been greater improvement, than in any other fruit, the best varieties having been introduced during the present century. The Bartlett has been in cultivation since 1789, while the Seckel was known before the Revolution, though its introduction here was somewhat later.

Grapes, also, have shown marked improvement. One of the first known varieties was grown on the Schuylkill, and named the Alexander; for some time, it seemed to be the only variety known. Soon after the Revolution, Henry Clay, and other distinguished men, took great interest in grape culture, and encouraged the growth of the vine. With the introduction of the Delaware and Concord, the modern era of grape culture began. We have now native grapes, that compare favorably with the best foreign varieties, and think we will soon be able to grow them of as good quality, and with equal success. The seedling exhibited by Mr. Ricketts, Newburg, N. Y., deserves special mention, and some of them were fully equal in size and quality to the best foreign varieties. There were also exhibited, some Clintons, from Lake Erie, which were far superior, in size and quality, to those grown here. Canada made an excellent exhibit of grapes, and, if



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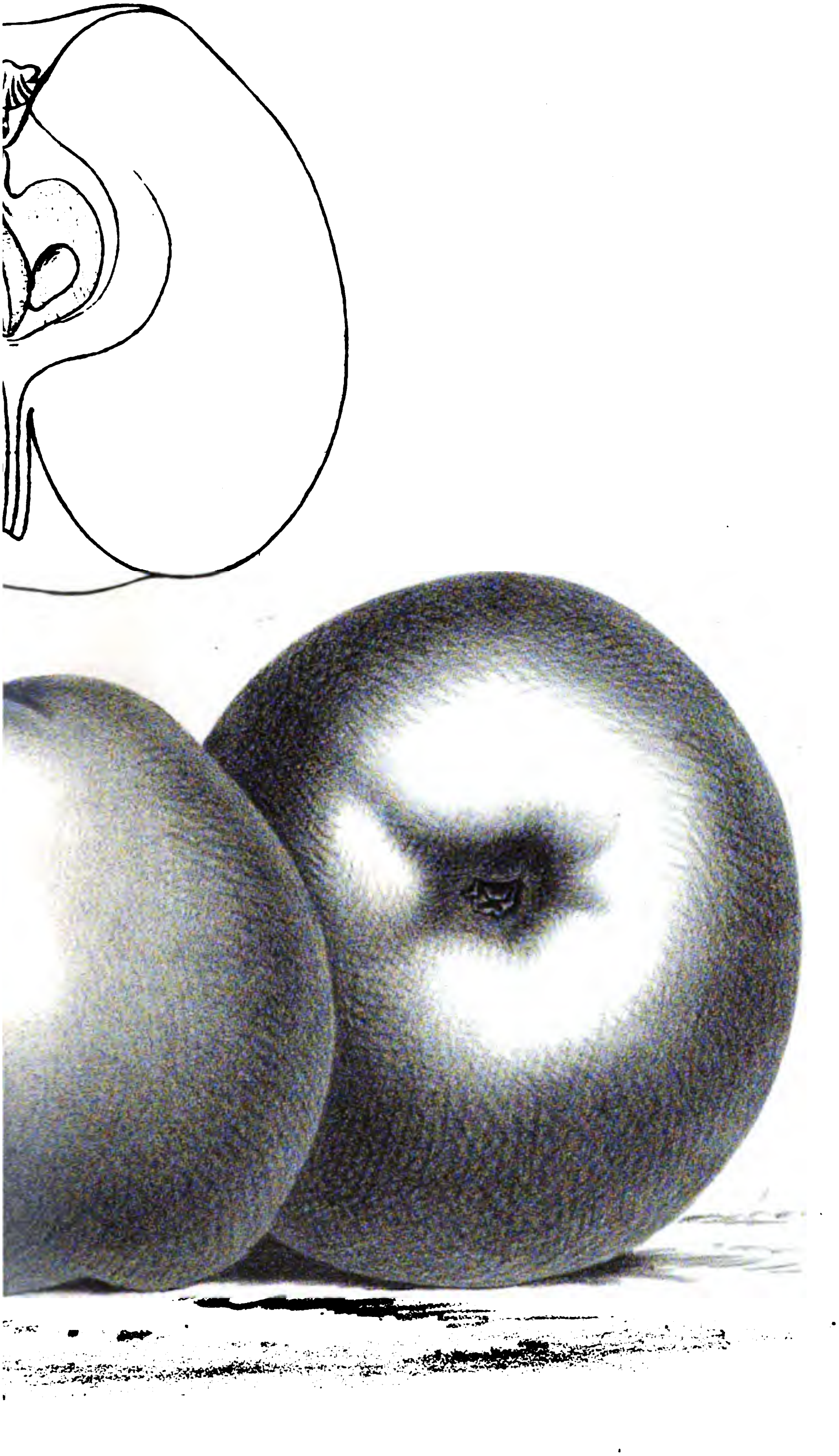

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their summers were longer, they would, probably, excel us in quality of fruit.

In apples, we have not improved so much in quality, as in adaptation of varieties to localities. We find the most popular kinds, now grown, are chiefly native varieties. There were on exhibition, some of the finest specimens of Golden pippin I have ever seen, although this is one of the old varieties, which was thought almost extinct; also, superior specimens of the Ribston pippin, one of the best of our varieties of apples. It seems, therefore, that the theory advanced by some, that many of our best kinds are wearing out, or becoming extinct, has no foundation in fact.

There was noticeable, in the apples exhibited, a remarkable fact, in regard to color; that is, they seemed brighter, as we go northward. This was especially the case, in comparing the collections from Iowa and Michigan, with those of Australia. The tendency northward, seems to be, to grow bright red fruit, while those from Australia, were more yellow or dull in appearauce. It was shown, also, that some varieties do well in almost every part of the country. Esopus Spitzenburg succeed equally well in Canada and Oregon; Baldwin seems to do well everywhere, so, also the R. I. Greening; thus it seems, while some kinds have only a local reputation, others do well anywhere. These observations encourage the hope, that we will continue our progress in this direction. We have every cause to persevere in our efforts to cultivate this fruit successfully.

Mr. Grover inquired about the California grapes.

Mr. Meehan. The grapes from California were remarkably fine, but as they were foreign varieties, such as we usually grow under glass, they were not considered as original products, and thus furnish no data for comparison.

President Satterthwait spoke very highly of the seedlings exhibited by Mr. Ricketts. They were all remarkably fine.

Mr. Hiller inquired whether Newburg was better adapted to grape culculture than the rest of New York? There must be something in locality. There are a few places in town and country where the Iona will do well, but, as for himself, he has never been able to do anything with it.

Mr. Engle. Mr. Ricketts' graps must be disseminated and tested, to establish their adaptability to all parts of the country.

Mr. Meehan. Mr. Ricketts' success has been too great, he has too many good kinds, and believing that new fruits should be patented, he asks an enormous price for them. If he had but one or two good varieties, some enterprising nurserymen might purchase and try to disseminate them.

Mr. Hoopes there is nothing special about Newburg to cause grapes to succeed better than anywhere else in New York. Mr. Ricketts' are all hardy grapes. Had the honor of being judge at the Centennial, and must say he never saw such fruit; considers them better than foreign varieties, not having the sweetness and sickening taste so common to that fruit. They are all (sixty or seventy kinds) hybrids, and Mr. Ricketts has their history and genealogy from the beginning. I don't believe to-day that I can grow one of them. They may succeed in that locality only.

Mr. Meehan, in his remarks on "Fruits at the Centennial," forgot to notice plums and crab apples. Of, plums there was a large and varied exhibit of some thirty or forty kinds, by Elwanger & Barry, of Rochester, New York. They were of fine size and quality, and the best collection he had ever seen. Michigan also made a fine exhibit of plums. Probably the best plums on exhibition were from Oregon; they were of excellent quality notwithstanding their immense size. Saw no "wild goose" plum exhibited.

In crab apples, there has been remarkable improvement, and we may expect in time to grow them as large as ordinary apples, and of as good flavor and free from astringency as the Baldwin. Montreal Beauty is being surperseded by Byers' sweet crab, which is larger and finer.

As a nation, we have also made some progress in the cherry. May Duke, Carnation, and the old pie cherry, were known during the Revolution.

Great credit is due Doctor Kirtland for his many valuable seedlings, among which may be classed most of our varieties.

Mr. Hoopes stated that if any of the members had specimens of new Pennsylvania fruits, he would be pleased, at any time, to make a drawing of the same for our annual report. He also moved that Casper Hiller, with a committee of his own selection, be appointed to examine the fruits on the tables of the Society, and report upon the same before final adjournment.

Adjourned to nine o'clock, A. M., Thursday morning.

THURSDAY MORNING, *January 18.*

Society was called to order by the President.

Committee on nominations submitted their report. Messrs. Hoopes and Satterthwait being both nominated for president, the former declined the nomination. He had understood that Mr. Satterthwait wished to be relieved, and would only be a candidate in case the present incumbent positively declined a reëlection.

President Satterthwait hoped Mr. Hoopes would accept the nomination. Was elected when not present at the meeting, and against his wishes. Would not be a candidate if Mr. Hoopes wll consent to stand.

On motion of Mr. Engle, the question was referred back to the committee.

Report of special committee, being called for, Mr. Sheller secretary of the Centennial committee, submitted the following.

Report of Centennial Committee.

The Centennial fruit committee held three meetings. One at Doylestown, immediately after the adjournment of the Society; one at Philadelphia to hear report of sub-committee, appointed at first meeting. Prominent members of the Centennial Board were called upon, who were apprised of our desire to have the fruits of the State exhibited. The committee was encouraged to proceed, and were proffered space and plates by the commissioner of the agricultural department.

The individual members of the committee pledged themselves to devote two weeks each to the care and assorting of the fruit, at the exhibition.

The next thing necessary, was how to raise funds to collect the fruit, and defray the expense of its delivery on the grounds. This was discussed at each meeting, and several members of the State Centennial Board were applied to, asking for a small share out of the $40,000 appropriated, but replied that the fund would be exhausted for other purposes. At the third meeting, held at Lancaster, a committee of two was appointed to endeavor to get an appropriation from the State, through the Legislature· Honorables Charles S. Wolfe of Union, Amos Mylin of Lancaster, Doctor Edge, of Chester, and several others, made strenuous efforts to procure an appropriation, but failed. The members of your committee met the expense, incurred in the furtherance of the object, for which they were appointed, out of their own pocket, and regret that their efforts were unsuccessful. We attribute our failure to the usual indifference of our State Legislature as a body in regard to agricultural and horticultural interests.

ALFRED S. SHELLER,
Secretary of Committee.

On motion, report was accepted, and committee discharged.

The regular order of business being resumed, Mr. Calder, president of Agricultural College, Pennsylvania, gave his "*Experience in Fruit Culture at College Farm.*"

Mr. Calder briefly referred to the location of the college in Center county. Some call it the "Farm School;" others, the "Agricultural College." Its correct name, is "Pennsylvania Agricultural College." It is, also, a scientific, classical, and military, as well as agricultural college. The farm contains 400 acres of excellent land, of which 350 are under good cultivation. Students were admitted in 1859. In 1857, however, a variety of fruit trees were planted, consisting of 600 apple, 400 peach, 200 plum, apricot, and nectarine, 250 pear, st. and dwarf, 200 cherry, and 1,500 grape vines.

In the beginning, this enterprise had no similar institution in the country to go to for example or instruction. Mistakes, and many changes were made, and, to-day, not one of the original trustees is in office. It was originally intended as a farm school, but, in 1862, Pennsylvania's share of government land was donated to this college, on condition that it give regular instruction in ancient languages and military tactics. From 1857 to 1862, many debts were contracted, which are still unpaid, but we hope to be able to pay them within a year. Six years ago, it had thirty-seven students, five instructors, and a floating debt of $52,000. It now numbers one hundred and sixty-one students, and there are but three colleges in the State that have a larger attendance. Ladies were first admitted three years ago. In the beginning, the managers tried to get along without women and the Lord. There is religious, but no sectarian, teaching. All denominations are represented. The presence of ladies does a great amount of good. Of the trees planted, in 1857, there were alive, six years ago, eight dwarf pear, out of two hundred and fifty; of four hundred peach trees, not ten survived, and not one apricot, nor nectarine. Four years ago, a vineyard, of five hundred vines, was planted, which is now doing admirably. The peach, pear, and plum trees are, also, flourishing. A number of varieties of raspberry, blackberry, currant, and gooseberry are, also, doing well. The location is a good one, and we do not lose more, by frost, than at Harrisburg. We try to teach our students that there is such a thing as good fruit. Now, they never disturb it, though former authorities of the college say their fruit was never allowed to get more than half ripe. The first year that the vineyard bore fruit, we had reason to believe that some was stolen. We told our students that if they would wait until the fruit was ripe, all could have as much as they could eat. A few weeks after, all were invited to the house, and helped bountifully. The result is, have now no grapes stolen. Fruit, generally, is allowed to get fully ripe. All are anxious, and willing to assist in fruit culture. Students are encouraged to take an interest in this, and share the profits of the planting and culture. He returned thanks to those who had favored the college with contributions, and invited all to pay the institution a visit. He concluded by requesting Mr. Carter, of the Eastern Experimental Farm, to give some account of the fruit planted there.

Mr. Carter had but little to say, as, thus far, but few reliable horticultural experiments had been made there. With pears, have succeeded very well. Have chiefly Bartlett, Seckel, and Lawrence, with a few Early Catharine, and D'Ete. Have found cultivation to be of advantage, and the application of mineral fertilizers has been efficacious. We chiefly use muriate of potash, and South Carolina rock. Trees are vigorous, and bear well. Have lost a few trees, by blight. Bark blight seems most destructive. Oil, applied externally, seems to give relief. Our pear trees are all standard.

Mr. Lint has had some experience with bark blight. It commences on the outer surface, and dries into the wood. Shaving the outside bark, with a knife, is a remedy.

Mr. Thomas asked Mr. Carter what quantity of South Carolina Rock he generally applies to the acre, and whether it produces much wood growth.

Mr. Carter: We generally apply 400 to 500 pounds to the acre. It is one of the cheapest fertilizers we can use.

NOXIOUS WEEDS.

BY JACOB STAUFFER.

When I consented to furnish an article on *Noxious Weeds*, I did not clearly comprehend the task I assumed. I was not then aware that I was to read or deliver it before such an intelligent audience, or bore them with a subject so seedy or weedy. I take it for granted that you are all familiar with Dr. Darlington's Agricultural Botany, published as early as 1847, in the course of which, troublesome weeds are noticed as they occur under the orders and genera of plants mentioned by him.

As an amateur in botanical science, I never discriminated; one species had the same claim to my attention as another. But all weeds are *noxious*, in a *certain sense*, when they occupy the place of plants we desire to cultivate. All plants out of place may be hurtful to other plants that are designed to occupy *that* place, some may be odious and offensive to sight. Wild plants, in some respects, may be beautiful, useful, and desirable, and yet weeds, and noxious to the horticulturist. Byron, speaking of the *wild plants* of Italy, says: "All thy *weeds* are flowers." It is true, many beautiful flowers come up spontaneously as *weeds*, without the care of cultivation. I labor under the difficulty of making the subject matter interesting or intelligent; the common names differ in various localities, hence, mistakes arise; yet, the scientific or universal name of each genus and species, either derived from the Greek or Latin languages, is seriously objected to by many who prefer the plain common name; such persons consider it *pedantic* to introduce the proper botanical or scientific names. I will endeavor to give the various names, including the German, by which plants are known. Before, however, entering upon my subject, I would call attention to the dispersion of seeds, such as have a winged pappus, by which the wind scatters them, those seeds in burs, or beset with prickles, that entangle the fleece of sheep, mane, &c., of horses, adhere to cattle, or stick to your clothing, and thus becomes distributed. Garbage, in seed, from the garden, becoming mixed with other litter on the barn yard. Birds distribute seeds as well as running streams of water, but against those latter modes we may not be able to protect ourselves; but the cleaning out of fence corners, neglected grounds around our dwellings, yards and gardens, road sides, copses and meadows, require attention if you wish to keep the fields or gardens free. The distribution of seeds is, of course, the first object to prevent, as, also, to prevent weeds going or *running to seed.* I will now start in, without any special arrangement or plan, since I do not attempt to give a lesson in botany, but an enumeration of conspicuous weeds, as weeds, to which I may add such information as may occur to me. Suppose we begin with those so odious in waste places, around dwellings and out houses, met with in various localities. The Burdock—*Lappa Officinalis*, German (*Gemeine Klette.*) The seeds and roots of this plant have medical properties, as a diophoretic and diuretic, used in rheumatism and gout. The name "Lappa," in Greek, means, "*lay hold of*," as do the burs or hook-awned-heads; this is common in manured soil around barn-yards; so, with the Jimson Weed or Thorn Apple, vulgarily called "stinking tom," botanically, *Datura Stramonium* (German *Stechapfel.*) Much of interest is connected with this plant, medicinally and historically. Beverly, in his history of Virginia, states that "it was gathered very young, for a boiled salad, by some soldiers at *Jamestown*, stationed there to quell the rebellion of Bacon; the eating of this salad turned them natural fools for several days." This locality and circumstance is why it is called "Jamestown Weed," corrupted into "Jimson Weed." The fresh leaves, boiled in lard till crisp, and then expressed, the lard makes a good healing ointment; children have been partially poisoned sucking the (honey in the) flower's tubes. Altogether, it is a coarse, vile weed. This is true, also, of the Clod-bur, or Cocklebur, the *Xanthium Strumarium*, and *X. Spinosum*. The Germans call it "*die Spitzglitte;*" the first is common around barn-yards, the latter in other waste places not so common, but equally noxious. The hound's tongue, *Cynoglossum Officinale*, common on road sides. The *C. Virginicum* is the wild comfrey; these have sticky pods that cling to the fleece of sheep and clothing; this latter is more common in woods, and is known by our Germans, as "*die Wilde Schwarz wuz*," the former, *die* "*Hunds-Zurge*," refer to the shape of the leaves; the odor is said to expel rats and mice, and should itself be expelled. Among prickly plants comes the common Nettle, *Urtica dioica*, German, *die Brennessel;* this is said to indicate a rich soil. I find that Shakespeare, in Henry V, refers to this, when he says:

"The strawberry grows under the *nettle*,
And wholsom berries thrive and ripen best,
Neighbour'd by fruit of baser quality."

Tender hands might not pluck them before tempted by their full grown quality. I question its utility, however, in strawberry culture.

Among coarse vile weeds we find the "Fulleis teasel," *Dipsacus.* German, *die Kartendistel*, occupying waste places in certain localities, around dwellings. The hedge mustard, *Sisymbrium Officinale*, (German, der Hederich,) is an unsightly plant, so also the "Velvet leaf," the abutilon (Sida,) aricennæ, (German, *der Sammtbl tterich Sida*,) has smallish axillary yellow flowers, (Malvaceous). The Poke, *Phytslacca decandra*, (German, *die Scharlachbere.*) intrudes itself occasionally too closely to the dwelling; even the elderberry bush, *Sambercus Canadensis*, (German, *Gemeiner Hohlunder*,) of pop-gun notority with the juveniles, is a questionable ornament, although not actually noxious nor exactly a weed, unless out of place, occupying ground more valuable for other fruit.

Among the noxious weeds, are several species of the Thistle family. Cirsium, German, *die Krartzdistelen*, preëminent stands the Canada, or Cursed thistle, (German, *die Acker Kratzdistel.*) *Cirsium arvense.* The subterranean stem, (called a *rhizoma*,) lies rather below the usual depth of furrows, so that plowing, or skimming, does not reach them, so that even when the top appears dead, by cutting off, the under-ground buds again spring up; hence, the trouble in getting rid of this pest, by half way measures. Continual cropping, as fast as leaves are developed, with the hoe, or otherwise, so as to exhaust the under-ground stem, and cause its decay from loss of vital force, tearing, and scattering the roots with the harrow, will not succeed to eradicate them, unless the entire root, or rhizoma, is removed from the soil. The other thistles I need not mention, but they are obnoxious among hay, and ought not be allowed to ripen, and scatter their winged seeds broadcast over your own, and your neighbor's lands, by every wind that blows. There is a field Bind-weed, has the flower of a morning-glory—the *Convolvulus arvense*, (German, *Die Ackerwinde.*) This has a long, creeping perennial root, and, in some sections, gives farmers some trouble. Next, we mention the Horse nettle, *Solanum Carolinense.* This has a perennial root, and so tenacious of life, that, like the Canada thistle, it is almost impossible to get rid of it, when once fully *rooted* and *grounded* in the soil, as it penetrates to a great depth. It is a native of the Southern States, but, as yet, only found in several localities in Pennsylvania. My neighbor, Mr. Hensel, took up a root. Determined to get the whole of it, he said, in a rather jocular manner; after digging seven feet after it, I had to give it up, and broke it off. He certainly showed me three feet of its length. The stem and leaves are beset with prickles, and do not add to its quality. If any of you have not made its acquaintance, then be on your guard. There is another plant, I was called to examine some years ago, in Rapho township, as it caught the plow, and gave my friend much trouble, and vexation. I found this to be a *Smilax*, of which there are two species, known as Green-brier, and thorny Bind-weed, found in sterile, old fields, on our slaty hills, matting up among other shrubs, and brambels. The *Smilax hispida*, has the long root-stock, and, like the *S. rotundifolia.* called common Green-brier. The *S. herbacea*, or carrion flower, is a climber, and frequently met with on fences; the scent of the blossom justifies the name, and makes it odious. This calls to mind the Poison ivy, growing on fences and trees. The *Rhusradicans*, (*der Gift sumac*,) Poison vine, belongs to the "Sumach family;" so, also, the Poison oak, growing in swamps—*R. vermix*, Poison elder. These are noxious, to say the least, if not, properly, weeds. Among climbers, about our gardens, is the Climbing Buckwheat. *Polygonum convolvulus*, Black Bind-weed. This belongs to the Knot-weed family—Smart-weed, so common in waste places. The *P. der sicaria*, and other species.

I have, on several occasions, seen the Star-cucumber, *Sicyos angulatus*, with its clammy haired stems, and little clusters of bur-like fruit, climbing rather profusely about garden fences, and needs curbing, as it grows spontaneously. I shall now give you a summary of other weeds, common in gardens and fields, simply to register their proper common English and German names. Some few may be obnoxious, others simple troublesome weeds. Celandine, *chelidonia majus*, swallow-wort (German, *das schellkraut die Schwalbenwurz*,) along fences, has a pungent yellow juice, said to cure tetter and ring worm, or remove opaque spots from the eyes. The False flax, gold of pleasure, *Camelina sativa*, in cultivated grounds, seeds oily and tenacious. St. John's wort, the *Hypericum perforatum*, (German, das johannaskraut,) said to give horses sore noses and feet, in pasture especially, if white haired. The wild carrot, *Daucus carrotta*, (German, die wilde möhr.) Wild parsnips, *Pastinaca satira*, (German, die wild pastinake.) The Flea-banes, *Erigeron canadense*, (German, das flehkraut, das schrafe.) Millfoil or yarrow, *Achillea millifolium*, (German, das achillenkraut schafrübben.) Mullein, *verbascum thapsas*, (German, das wollkraut.) There is also the sleek or moth mullein, *v. blattaria*, (German, tranzonkraut,) quite common in pasture fields, and a nuisance also. The Blue weed or viper's bugloss, *Echium vulgare*, (German, der natterkopf;) this is a coarse prickly weed, having beautiful blue flowers, met along the side of roads, as also the chicory, *Cichorium*, (German, die cichorie.) The May weed or wild chamomile, *maruta cotula*, (German, wild chamomile.) The White weed, *Chrysanthmeum Tencanthemum.* Oxeye daisy, so common in Chester county, is rapidly extending through Lancaster county. It has a long name, but that must not screen it from its useless propagation. The Tick seed, a *Coreopsis*, and the bur marigold, a species of *Bidens*, are obnoxious. The Toad-flax, *Linaria canadensis*, (German, das flachskraut.) is objectionable, as is the clammy weed, so common on road sides. The *Cuphea viscossima*, is common in sandy fields. The Indian tobacco, *Lobelia inflata*, is also common, and an acrid plant in pastures. The Sorrel dock, rumex . . . . sheep sorrel, (German, *der sauerampfer*,) indicating a sour soil that needs liming. The Five finger, *Potentilla canadensis*, (German, das fünflingerkraut,) in dry fields. The common Rag weed, bitter weed, botanically called very improperly *Ambrosia artemersifolia.* This "*food for the gods*," as the name implies, is a miserable, coarse, and vile weed, covering many of our fields after the crops are removed, also called Roman wormwood, and hog weed. I am not sure whether hogs eat it, or that it is for any use, unless, when plowed down, it may rot, and restore its substance to the soil. How is that? I think our farmers call it *wermuth*, in German. The wild garlic leek is an *allium*, (German, der acher lauch.)

We learn that the wild garlic, (*allium vineale*,) was introduced by the Welsh imimgrants, for the purpose of supplying an *early pasture.* Be that as it may, it is certainly quite a nuisance in pastures, and imparts an unpleasant flavor to *milk*, *butter*, &c. It is said even to injure the *flour*, when abundant among wheat, but it is getting rare, and beautifully less, by a judicious rotation in crops. I am admonished to stop. A crowd of weedy plants suggest themselves: The shepherds' purse, *capsella bursa-pastoris*, (German, das Täschelkraut;) the corn-cockle, lijchnis githago, (*die trespe;*) the ripple-grass, *plantago lanceolata*, (der wegetrit spitz bletericher wegetrit, or wegerich.) This is commonly corrupted into spitzewetterich, as known, and objectionable when the seed is mixed with cloverseed, more especially. The broad-leaved plaintain, so common in our yards, is common in Europe, growing along paths, hence the Germans called it *wegetrit.* The Indians noticed that it followed, or rather preceded, the immigrants, and called it, "the white man's foot." The cheat, or chess, so much talked about, as transformed wheat, is a verily well-marked plant. The *bromus secalinus*, (German, roggen-trespe.) This pest is well known, and has been pretty well ventilated. Those who weed gardens, meet with many weeds, that I have not mentioned. They are only obnoxious, so far, as they require labor and vigilance, to keep the beds free, when cultivating culinary plants. But, I must not stop, and relieve you from the infliction of minor weeds. Some other noxious weeds may have escaped me, in presenting the subject in this loose manner, just as they would occur to mind, or one be suggested by the other. One thing may be said. The German, common English, and scientific names, are given, and may be of some use as a reference, should it be deemed worthy of publication.

To refer to the many plans suggested to get rid of special weeds, and give many interesting facts, would require a volume. "Eternal vigilance" is demanded, to aid the useful, and to suppress and eradicate the useless. While men sleep, "tares may be sown." So, fight on. Allow me to conclude, with a few lines from Cowper. Should you fail, occasionally, of success, he says:

"It were long,
Too long, to tell th' expedients and the shifts,
Which he that fights * * * * *
Devises, while he guards his tender trust;
And oft at last in vain."

After reading his essay, Mr. Stauffer called attention of the members to his illustrations of weeds and insects, and invited the Society to examine them at their leisure.

Mr. Meehan stated that as editors were supposed to know everything he frequently had propounded to him some very amusing questions. He once had an inquiry about a weed called the "Wandering Widow." He had often heard of "Grass Widows," and "Widow's Weeds," but never of the "Wandering Widow." Would Mr. Stauffer inform him what it was?

Mr. Stauffer said it was probably "Mourning Widow," a drawing of which he exhibited in his book.

Mr. Harvey thought names of noxious weeds were of little use, unless some methods were given for their destruction. The essayist failed also to mention one of the most troublesome weeds in Chester county, the *Teucrium Canadensis*, or wood sage.

Mr. Meehan bought some years ago a piece of land, which was overrun with "Horse Nettle," and Couch grass. It was planted in nursery stock, worked with hoe-harrow and hand hoes, and the weeds thoroughly destroyed in three years. No plant can grow for any length of time without leaves, and, if rightly managed, it is less work to destroy weeds than is generally supposed.

President Satterthwait considered "Couch Grass" the worst of all weeds, and one of the most difficult to get rid of. Has known farmers to fight it for twenty or thirty years without success. The only time to destroy it, is by working it in hot weather. One hour's hot sun in June or July will kill it, but a month's cultivation in spring will only spread it. Canada Thistle can easily be destroyed in a year or two by pulling it up.

The subject being closed, the question of

FOREST CULTURE

was next taken up for discussion.

Mr. Hoopes stated that it was at his suggestion that this topic had been proposed. He read a letter from a member of the Legislature from Chester county, who recommended a discussion of this subject by the Society, stating further his opinion that there should be some legislation in the matter, and offering to take charge of any bill that might be prepared on this subject.

Mr. Meehan thought there has been more anxiety about the destruction of forests than necessary. He had read a letter, written by Benjamin Franklin, who also felt great anxiety about the destruction of our forests, and who predicted that, in eight years from that time, the timber supply of our country would be exhausted. He had traveled considerably west and south, and was surprised to find so great an amount of timber near some of the great business centers. Almost within view of Detroit were thousands of acres which could be bought at $5 per acre, and in other localities, in the great West, were thousands of acres that had better be cut down and planted in grain. Thought the matter of forest culture could, for the present, be safely left to individual enterprise. It might be a profitable investment to plant where timber is scarce, especially on prairies, on lines of railroad, or in the vicinity of large cities. Companies might be formed for this purpose, and legislation, protecting or encouraging them for a time by exemption from taxation, might be advisable, and would be more effectual that the usual method suggested, of rewarding the planting of a few trees by individuals.

Mr. Engle differed in some respects from the views advanced by Mr. Meehan. Coal has come to the relief of timber since Franklin's time, and had it not been for its discovery, there is no telling what might have been our present condition. Horace Greeley said that every farm should have twenty-five per cent. of forest, and would be more valuable in that condition, than if all were arable. Would object to Mr. Meehan's plan of forming companies to plant forests. The tendency would be to have few and large tracts, instead of a general distribution of timber. He would advocate such legislation as would encourage planting by the roadside.

President Satterthwait fully agreed with Mr. Meehan, that no legislation would be necessary or wise. He believed that timber has become less and less valuable for fifty years. In some localities, the problem is, how to get rid of it. In some localities, it might be made profitable, but it is a subject for individual enterprise. As a protection to fruit trees, the planting of timber belts may be encouraged, but not from any fear that the supply will soon be exhausted.

Mr. Stauffer. The idea of legislation to protect or encourage timber culture, probably originated in France, where, by denuding the land of forest, the soil had become sterile. Experiments were made there, and, it is said, small streams and rivulets that had been dried up, were restored. He believed that the destruction of forests had a tendency to dry up the springs, and said there were statistics on record to prove this.

Mr. Meehan. There is, probably, no State in the Union, where Mr Stauffer's idea prevails more extensively than in Massachusetts. While that State has twenty per cent. more forest now than it had fifty years ago, it has now less arable land than then, and also less snow and rain. The idea that springs dry up from this cause, is rather absurd, when we consider the fact, that the sources are often hundreds of miles away. In regard to the reported rise of the waters of Salt Lake, in Utah, and the attributing of this rise to the cultivation of forests by Brigham Young, Mr. Meehan pronounced it a delusion. Mr. Young and his people had really cut away the forests, and planted orchards in their stead. He suggested that this Society pass a resolution that, in their opinion, legislation on the subject of timber or forest culture, is not necessary.

Mr. Calder hoped no resolution of that kind would be passed. The idea that our forests are in danger of extermination, is becoming popular, and we should be careful not to commit ourselves to the opposite opinion. Statistics show that forests have more or less influence upon rain-fall, and he could not vote for this resolution, unless he had some facts and figures, giving the Society's reasons for such course.

Mr. Bissell hoped the Society would not commit itself to the doctrine, that the destruction of forests is not injurious.

Mr. Grover stated, that in Ohio, instead of timber land depreciating in value, it is becoming more valuable every year. Knew of one tract, in particular, that was bought a few years ago, at eight dollars per acre, and sold lately at sixty dollars. The question of timber culture is much agitated in his State, and the West generally. Legislation is suggested either in the shape of premiums for plantations, or the abatement of taxes upon such enterprises.

Mr. Calder thought the question an interesting one, and not exhausted. He, therefore, moved that Mr. Meehan be requested to prepare an article, for our next annual meeting, on the subject of "Forest Culture," taking the ground that legislation is not necessary, and that Mr. Sheller prepare an article taking the opposite view.

Mr. Sheller declined, said he wouldn't discuss this question against Mr. Meehan under any consideration.

Mr. Hoopes moved an amendment substituting Mr. Calder for Mr. Sheller.

Mr. Meehan thought it unnecessary to carry this question over to another meeting. Thought legislation of any kind impracticable. The State does not own any forests or timber, and could not restrain the individual from doing with his property as he thinks best.

Mr. Calder thought it might be proper for the Legislature to exempt from taxation those who engage in forest culture. He was nôt anxious for discussion. He moved that the further consideration of the question be postponed, and that Mr. Meehan be requested to give his views more fully at our next annual meeting. The motion was carried, and the next question taken up for consideration.

THE APPLE TREE BORER AND ITS DESTRUCTION.

Mr. Stauffer exhibited a cut of the borer from his book, and explained its habits. The female punctures the tree and deposits its egg, from this a maggot is hatched, which eats its way under the bark, sometimes girdling the tree. The borer which attacks the quince and ash, is the same as the apple borer. Different species of this insect attack the raspberry, currant, and mulberry. The peach borer is also a different species.

Mr. Meehan remarked that there were two kinds of apple tree borers, one attacking the tree near the ground, the other higher up along the stem or branches. In the West, they are but little troubled with our borer, but have the flat-headed borer which is more destructive.

Mr. Brinton inquired of the president the best way to destroy the borer, and also how to prevent its getting into the tree.

The President. The borer deposits its eggs during June, July, and August, and generally as nearly as possible to the ground, it then works downward into the ground. To destroy it ,he "hills up" around his trees, so as to have the eggs deposited as high as possible. During September and October he examines his trees, and the borer is destroyed with a knife. A little time and perseverance are necessary to destroy it.

Mr. Bissel has used, with success, a wash made of soap-suds, oil, and common clay; applies it in the spring with a brush.

Mr. Meehan advocated the use of linseed oil as a remedy and cure for "scale louse," red spider, and he also believed it to be a remedy for blight. He had received the hint in Oxford, Mississippi, during one of his visits South, and has himself applied it with satisfactory results. He washed 1,500 trees that were infested with "scale" and red spider, destroying them entirely. The oil was applied in April, remaining on until middle of July. Thinks if apple trees were oiled or painted near the ground, it would prevent the borer. He used about four gallons of oil on 1,500 trees, and one boy did the work in two weeks.

Mr. Lint opposed the use of oil on trees. It sometimes carbonizes and turns them black.

The committee appointed to audit the Treasurer's account, submitted their report. On motion, report was accepted, and committee discharged.

Mr. Sands, secretary of Maryland Horticultural Society, begged permission to interrupt the regular proceedings of the Society, in order to call attention to the biennial meeting of the American Pomological Society, which meets in Baltimore, 12th, 13th, and 14th of September, next. He hoped this Society would send representatives, as well as specimens of fruits.

Dr. Eshleman inquired whether there was more than one variety of Rambo.

Mr. Reist knows of three distinct varieties. Thinks the apple Dr. Eshleman describes is the " Red Streak," or " Seek-no-further."

Mr. Hiller. We have in Conestoga township three varieties of Rambos. The Summer *Rambo* is a large variety, and out of season by September. The regular old Rambo does not do well. We have another variety, having the flavor of the Rambo, but it is a winter variety, not being fit for use until after the holidays. .

Mr. Engle. The Summer Rambo is a distinct variety, and entirely different from the others. It is earlier, and larger, and different in flavor. Some consider it synonymous with Grosh.

Mr. Hoopes hoped that, before adjournment, some action would be taken by the Society on the invitation of Mr. Sands. He suggested that all exhibitions of fruits be made in the name of the Pennsylvania Fruit Growers' Society, thus giving our Society the standing it deserved.

He moved that a committee be appointed by the chair, to take charge of and arrange all Pennsylvania fruits sent for exhibition.

The motion was subsequently withdrawn, and Mr. Hoopes was requested to prepare a resolution embodying his views, and submit it at the afternoon session. Adjourned.

AFTERNOON SESSION—THURSDAY.

The Society being called to order by the President, Mr. Hoopes submitted the following:

Resolved, That the cordial invitation of Mr. Sands, secretary of the Maryland Horticultural Society, requesting this Society to be well represented in the forthcoming convention of the American Pomological Society, to be held in Baltimore, in September next, is accepted, and that a committee of fifteen members be appointed to so represent this body.

Also, that the general fruit committee be requested to use strenuous efforts to make a creditable collection of Pennsylvania fruits at the aforesaid convention, take charge of the same upon arrival at its destination, and see that they are properly displayed in one collective exhibit.

Also, that Henry M. Engle, A. S. Sheller, Geo. B. Thomas, Jas. Calder, W. S. Bissell, Thos. Meehan, J. I. Carter, L. S. Reist, John G. Engle, Josiah W. Pyle, E. Satterthwaite, Geo. H. Small, E. J. Evans, Wm. P. Brinton, Calvin Cooper, compose said delegates to the Convention, and they are requested to render such assistance as may be necessary in receiving and arranging our exhibit.

On motion, the resolution was adopted unanimously.

The President stated that next in the order of business would be the selection of a place for the holding of our next annual meeting. The following, referring to this subject, was read by the Secretary:

OFFICE OF MUNCY CREEK RAILWAY COMPANY,
HUGHESVILLE, PA., *15th January, 1877.*

E. B. ENGLE, *Secretary &c.:*

MY DEAR SIR: I regret my inability to be with you, at our annual meeting, this week, at Lancaster. Allow me to suggest and urge your adopting the city of Williamsport, as the place for holding our next annual meeting. Ours is a good fruit county, and many very fine fruit places, and lots of active, intelligent fruit-men all around us. We would enlarge the list of life members, at least twenty-five, as well as annual members. Previous to the Pennsylvania State Fair, being held in Williamsport, I pledged one hundred life members. We readily got one hundred and ten, and made $7,000 over and above all expenses; and after the fair invested $5,000 in U. S. bonds, which, I regret, has all been lost by holding the fair in poor localities since. I have no doubt of *full* meetings, and a good display of choice fruit.

With sentiments of kind regard, for my many friends that will be with you,

I remain, respectfully yours,
B. MORRIS ELLIS.

Mr. Hoopes moved that Mr. Ellis' invitation be accepted, and Williamsport be the place of our next meeting, in January 1878, which was adopted.

The following communication from Cyrus T. Fox, Secretary Berks County Agricultural and Horticultural Society, was read by the secretary:

OFFICE OF THE BERKS COUNTY
AGRICULTURAL AND HORTICULTURAL SOCIETY,
READING, PA., *January 15, 1877.*

Hon. HENRY M. ENGLE, *Chairman of the General Fruit Committee of the Pennsylvania Fruit Growers' Association:*

DEAR SIR: As I shall be unable to attend the annual meeting of the Pennsylvania Fruit Growers' Association to be held, this week, in Lancaster, Pa., I respectfully beg leave to submit the following written report of the action of the Berks County Agricultural and Horticultural Society, relative to the promotion of fruit-growing in Berks county.

Yours, very sincerely,
CYRUS T. FOX, *Secretary.*

To the Officers and Members of the Pennsylvania Fruit Growers' Association.

GENTLEMEN: At the annual meeting of the Berks County Agricultural and Horticultural Society, held in the city of Reading, on the 15th of January, 1876, the following resolutions were unanimously adopted:

Resolved, That this society offer a premium of $300, to be divided as follows: $200, to the person showing the greatest increase in the number of choice fruit trees planted, during the time named in the resolution following, and $100 to the person showing the next largest increase.

Resolved, That, in order to carry out the above resolution, a committee of five be appointed, the president and secretary to be *ex officio* members of the committee, through which the awards shall be made, at the annual meeting, in January, 1879. Said committee shall have the right to name the kinds of fruits to which the premiums shall apply, as also, the different varieties of each, a list of which shall be prepared, and published immediately after their appointment by the president, after which, and until November 1, 1877, any one in Berks county, desiring to compete for said premiums, shall notify the committee, who will then examine the premises, and keep a record of the number and variety of fruit trees already theron.

In accordance with the resolutions, the president, A. F. Boas, Esq., appointed the following committee: Henry Eppihimer, chairman, Christopher Shearer, Hon. George D. Stitzel, John B. Holloway, and George K. Levan—all gentlemen experienced in fruit growing, or interested in fruit culture.

The committee held meetings, on the 12th and 19th of February, ensuing, when the following fruit list and rules were agreed upon; the amount of premiums having been increased to $400, which action was approved, at a meeting of the Society, held on the 4th of March, and the same ordered to published in the papers of the county, as follows:

IMPORTANT TO FARMERS AND FRUIT GROWERS.

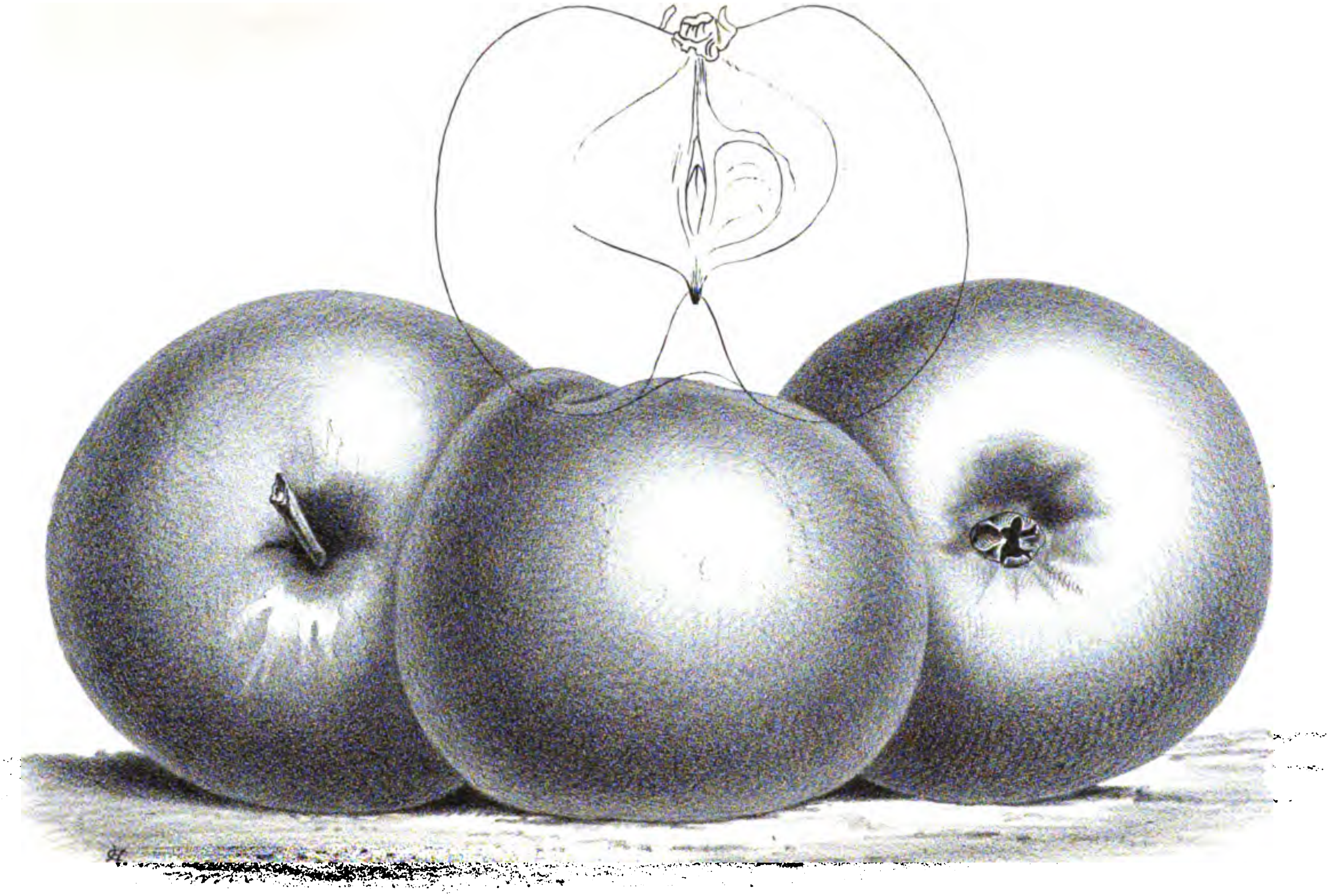
$400 IN PREMIUMS.

The Berks County Agricultural Society, in order to promote the cultivation of fruit, and introduce the planting of fruit trees in Berks county, offer $400 in premiums, as follows:

$200 to the person showing the greatest increase in the number of choice fruit trees planted on his premises, up to November 1, 1877.

$100 to the person showing the next largest increase.

$60 to the person having the best regulated orchard, of not less than fifty trees, planted during the above time.



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$40 to the person having the next best regulated orchard.

Persons desiring to compete for the above premiums, must notify the chairman or secretary of the committee, on or before November 1, 1877, in order to allow the committee ample opportunity to inspect the premises, and note the number and variety of trees already thereon.

The final award of premiums will be made at the annual meeting, in January, 1879.

The following fruit list has been adopted, from which competitors are expected to make their selections. Other choice and well-known varieties not embraced in this list, will also be accepted by the committee.

FRUIT LIST.

APPLES.

Summer Varieties.—Cornell's Fancy, Early Harvest, Early Joe, Knowle's Early, Large Sweet Bough, Red Astrachan, Summer Queen.

Autumn Varieties.—Dyer or Pomme Royal, Duchesse of Oldenburg, Fall Pippin, Gravenstein, Jefferis, Maiden's Blush, Pumpkin Sweet, Smoke-House, (late.)

Winter Varieties.—Baldwin, Belmont, Ben Davis, Canada Reinette, Domine, Dutch Migonne, English Russet, Esopus Spitzenburg, Fallawater, Golden Russet, (N. Y.,) Golden Pippin, Grimes' Golden Pippin, Hubbardston Nonsuch, Jonathan, King of Tompkins County, Lady's Sweet, Melon, Monmouth Pippin, Mother, Newtown Pippin, Northern Spy, Peck's Pleasant, Rambo, Smith's Cider, Keim, Krauser, Smoke-House, Swaar, Tewksbury Winter Blush, Twenty Ounce, Wagener, Westfield Seek-no-Further, Wine, Wine Sap.

PEARS.

Summer Varieties.—Bartlett, Bloodgood, Brandywine, Clapp's Favorite, Early Catharine, Early Tyson, Manning's Elizabeth, Rostiezer, Summer Julienne.

Autumn Varieties.—Belle Lucrative, Beurre Clairgeau, Beurre D'Anjou, Buffum, Flemish Beauty, Howell, Louise Bonne de Jersey, Maria Louise, Paradise d' Automme, Seckel, Shelden, Souvernir du Congress, St. Geisselis, Washington, White Doyenne.

Winter Varieties.—Columbia, Dana's Hovey, Jaminette, Josephine de Malines, Lawrence, Mount Vernon, Reading (for town yard.)

Dwarf Varieties.—Beurre Diel, Duchesse d'Angouleme, Flemish Beauty, Vicar of Winkfield.

PEACHES.

Alexander Early, Crawford's Early, Crawford's Late, Early Beatrice, Early York, Foster, George the Fourth, Hale's Early, Large Early York, Morris White, (late,) Mountain Rose, New York Rareripe, Old Mixon

Free, Reeve's Favorite, Smock Free, Snow, Stump the World, Susquehanna, Variegated Free, Ward's Late.

CHERRIES.

Belle d'Choisy, Belle Magnifique, Black Tartarian, Black Eagle, Downer's Late Red, Downton, Early Purple Guigne, Early Richmond, Elton, Governor Wood, Kentish, or Pie, Knight's Early Black, Late Duke, May Duke, Montrose de Moselle.

PLUMS.

Autumn Gage, Coe's Golden Drop, Duane's Purple, German Prune, Huling's Superb, Imperial Gage, Jefferson, Magnum Bonum, red; Magnum Bonum, yellow; Smith's Orleans, Washington, Yellow Gage.

QUINCES.

Apple, or Orange; Rea's Mammoth.

A. F. BOAS,
President.

H. EPPIHIMER,
Chairman Committee on Fruit Premiums.

CYRUS T. FOX, *Secretary.*

The list of fruit comprises only such varieties as have, from actual experience of fruit growers in this county, been found to succeed. It embraces fifty varieties of apples, thirty-five of pears, twenty of peaches, fifteen of cherries, twelve of plums, and two of quinces. A number of varieties, usually found in catalogues, and highly recommended by nurserymen, are omitted, on account of having been found, after a thorough trial, unproductive, in this county, and, consequently, undesirable. The Rhode Island Greening apple is among the latter class. The list has been made about five times as large as there is any necessity for, so as to give plenty of choice to farmers, and others, in making their selections. The Society recommends the planting of trees, in the following proportion, in setting out a fruit orchard: Ten varieties of apples, seven of pears, five of peaches, four of cherries, three of plums, and one of quince. The list embraces a number of varieties of fruit, native to Berks, as, for instance, the Keim, Krauser, and Rambo apples, and the Reading pear. The last mentioned, however, is only recommended for town yards, or sheltered locations.

The committee, also, adopted a rule, in reference to number of trees planted, making the apple and pear the standard of value; one tree, of either of these, planted, to be equal, in relative importance, or value, to two cherry trees, three plums or quinces, or to four peach trees. Thus, a competitor, who has planted one hundred apple trees, will be regarded as having done as much to permanently increase the production of fruit in the county, and entitle him to the premium, as the person who has planted four hundred peach trees. A general cultivation of fruit is, however, recommended, and will be taken into consideration, in making the awards. The exclusive planting of cherry, or peach trees, will not entitle the competitor to the premiums, offered by the Society.

The Society recommend the Smoke-House, Maiden's Blush, Seek-no-Further, Smith's Cider, Red Astrachan, and Krauser, as the best six varieties of apples, for profitable cultivation, in Berks county; and Troth's Early, Mountain Rose, Large Early York, Crawford's Early, Crawford's Late, and Old Mixon Free, as the best six varieties of peaches, for general cultivation.

Competitors, for the premiums of the Society, can have their names registered, up to November 1, 1877; and, during the year 1878, the committee will visit the premises of the competitors, and make a personal examination of trees planted, and their condition. The final awards of premiums will be announced at the annual meeting of the Society, to be held on the third Saturday in January, 1879.

The action of the Society has had an excellent effect, in stimulating fruit growing in Berks county, and a number of farmers have already entered their names as competitors for the premiums. It is confidently believed, that more fruit trees, of different varieties, were planted, during the centennial year, in Berks county, than during the five preceding years.

In conclusion, I would report, that the crop of apples in Berks, last year, was one of the largest ever known, in the history of the county. The fruit was remarkably fine. Picked winter apples sold, during the fall, at thirty-five to fifty cents per bushel, in the orchard, or fifty to sixty cents per bushel, delivered in Reading. Apples, on the tree, were sold at twenty to twenty-five cents per bushel. Apples for cider, or "apple jack," (a Berks county commodity,) were delivered at the press, or distillery, for ten to fifteen cents per bushel.

The Society made a large display of apples and pears at the Centennial Exposition, during September and October, occupying two large tables, or over four hundred plates, embracing several hundred varieties, and including all varieties native to the county, with descriptive cards attached. For this display of fruit, the Society was decreed an award.

Hoping the eighteenth annual meeting of the Fruit Growers' Association may prove pleasant and profitable to all in attendance, and that much good may result from your deliberations,

I remain,

Yours, very respectfully,

CYRUS T. FOX,

Secretary of the Berks County Agricultural and Horticultural Society.

READING, PENNSYLVANIA, *January 15, 1877.*

The committee appointed to nominate candidates for the several offices, for the year 1877, submitted the following nominations:

PRESIDENT.

Josiah Hoopes.

VICE PRESIDENTS.

H. M. Engle,
George H. Small,
John I. Carter.

RECORDING SECRETARY.

E. B. Engle.

CORRESPONDING SECRETARY.

W. P. Brinton.

TREASURER.

George B. Thomas.

Mr. Hoopes had fully determined not to accept the presidency of the Society again. Thought there were others more competent to fill the office than himself, and he would gladly waive his right in favor of any one else. If, however, it was the wish of the Society, that he should serve, he would be willing to do so.

On motion, the treasurer, Mr. Thomas, was authorized to cast the ballot of the Society, and the aforenamed candidates were elected.

The next question for discussion, in the order of business, was

THE CONSTRUCTION OF CHEAP FRUIT-ROOMS.

Mr. Carter proposed this question, not because he had anything to say about it, but for the purpose of eliciting information. All fruit growers, no doubt, have felt the need of a good fruit-room, in the fall of the year, when fine pears, peaches, &c., often suffer for want of a suitable place to store them. Some of our fall pears would be much increased in value, if we could keep them out of market for awhile. Bartlett, when forced into market, in their season, never realize so good a price as later. Mr. Hellings, of Philadelphia, has a good arrangement for the purpose, but asks $500 for the privilege of constructing. Would be glad to hear of a cheaper plan.

Judge Stitzel could not add much to what he had said upon this subject, at a former meeting. A gentleman in Reading has a building for this purpose, that holds 3,000 bushels. Keeps Pound apples until October following. A charge of fifteen cents per bushel, is made for keeping the fruit of neighbors and others in his building. It is of simple construction, built of frame, entirely above ground, and ice is used to keep down the temperature. The fruit-room is about ten feet high, the ice being stored above. The ceiling is made water tight, to prevent moisture. The building is weather-boarded outside, and wainscoted inside, the space being filled with tan. The fruit is placed in boxes, holding about two bushels each, the bottom of one box being the lid of the one next under it. Most varieties of apples will keep well in this building. Has kept Greening and Esopus until July. Krauser will not keep. Since this house has been constructed, and gives satisfaction, others are building. This one cost about $350.

Mr. Engle thought the principle described by Judge Stitzel was a good one, and could be employed on any scale desired. Referred to a neighbor, who constructed an ice-house, with side cellar adjoining. This answered the purpose very well, so long as the ice did not get too low. Built for himself an ice-house, on a small scale, which answers the purpose admirably. When full, his body of ice is about twelve to fourteen feet deep, about half of which is underground. Part of this underground space is partitioned off for a cellar, but instead of a perpendicular division between the ice and cellar, it is made oblique or slanting, to a point about even with the surface of the ground. He thus combines the two principles spoken of, having ice both at the side and overhead. Finds no difficulty in keeping fruit from one season to another, even without ventilation. Takes great care to pack his ice tight, leaving as little space for the circulation of air as possible. The walls or sides should be watched closely, so as to fill up any spaces formed by melting ice. Is well aware that ice overhead is better than his method, but this plan is cheaper.

Judge Stitzel spoke of another building for the purpose of a fruit-house, which was partly under ground, and built with stone walls; did not, however, preserve fruit as well as the one just described. He inquired whether any one present had succeeded in keeping fruit in spring-houses.

Mr. Lint has kept fruit in spring-houses, where there is running water. Thought fruit would keep well where there is an even temperature.

Mr. Sheller knew a number of farmers in Union county, who kept fruit successfully in spring-houses.

Mr. Tracy has seen fruit kept in excellent condition, by putting in barrels, and burying in the ground, placing the barrels on their sides, and covering them lightly with earth. Has known Maiden's Blush buried in September and October, to come out in good condition in April, while Greenings were kept until June.

The following question was next taken up for discussion:

THE BEST TREES FOR WIND-BREAKS, AND ARE THEY REALLY BENEFICIAL?

Mr. Hoopes asked Mr. Carter's experience with wind-breaks at the Expermental Farm.

Mr. Carter stated that, some twelve or fifteen years ago, several rows of evergreens were planted, that are now effectual wind-breaks. Is satisfied that they are really beneficial, but did not believe that they prevented blight. Norway Spruce and Arbor-Vitæ were planted alternately. Arbor Vitæ can soon be cut away. The trees are twenty-five to thirty feet high.

Mr. Harvey considered Norway Spruce one of the best and hardiest trees. American Arbor Vitæ also cheap. Is satisfied that these screens or wind-breaks are beneficial. They afford a shelter for insectiverous birds, which is also a consideration.

Mr. Hiller has a peach orchard, part of which slopes north and part south. On the north side, there is a natural protection, in the shape of a forest, near which fruit ripens eight to ten days earlier, than where exposed to the west winds. This protection is an advantage, where we wish to raise early varieties of fruit, but does not think it will add to the health or productiveness of the trees.

Mr. Engle has had some experience with wind-breaks, and endorsed the views advanced by Mr. Hiller. Thinks them also a decided advantage in the growth of early vegetables.

Mr. Stauffer, on a visit to Sporting Hill, about twenty-five years ago. noticed two orchards, one on low ground, the other on an elevation. He noticed in the morning the orchard on low ground was covered by a dense fog, resembling a lake of water. This orchard was entirely ruined by blight, while the one on high ground was uninjured.

Mr. Hoopes said we must be careful not to overlook one of the real benefits derived from screens. It is not so much the extreme cold which is prevented, as the high winds, which cause excessive evaporation.

Dr. Eshleman thought if protection of this kind was of any benefit, it would show its advantages in the middle of the orchards. According to his experience, however, those trees on the outside of our orchard and most exposed generally do best.

Mr. Harvey. We are all aware of the difference between a grape-vine planted near a building, and one standing out and unprotected. This may be one of the causes of Mr. Ricketts' success with his new seedlings. Planted near the Catskill mountains, they have the great advantage of shelter and protection.

Mr. Meehan thought screens or wind-breaks sometimes an advantage, and sometimes not, but, on the whole. he was inclined to recommend them One objection is the harbor they afford for birds, that are destructive to our fruits. Considers Larch preferable to Norway Spruce:

Mr. Hoopes is opposed to European Larch. It being deciduous, affords no protection in winter, when we most need it.

Mr. Carter. Our orchard at the Experimental Farm is the best protected of any in the neighborhood, and suffered less from damage by equinoctial storms last fall than any other.

The following question was then taken up for discussion:

Best Methods of Preserving Winter Vegetables.

Mr. Engle asked the President to give his method, as he had probably more experience than any one present.

President Satterthwait preferred hearing from some of the other members first.

Mr. Hoopes has had the best success in keeping cabbages and celery in his spring-house, putting roots and stems directly into the water. Has kept them fresh and sound all winter.

Mr. Engle said he had tried Peter Henderson's plan for keeping celery, by putting it in trenches, but had usually failed. Probably he misunderstood Mr. Henderson's directions. This year he put some in his cellars, and succeeded in blanching and preserving it in good order.

President Satterthwait said the one essential point in keeping celery, is to keep out frost and moisture. Has kept his successfully by putting in narrow trenches, banking up with earth sufficiently to carry off the water, and cover with forest leaves. Is careful not to cover too early. More danger from being kept too warm, than from a little frost. Cabbage should be placed upon the ground in rows with heads down, and ground thrown up on each side with the plow. No vegetables should be covered thickly at first, but gradually, as cold weather advances.

Mr. Lint thought some plant winter vegetables too early, and, in consequence, are obliged to put them up too early. In our latitude, cabbage and celery should not be put away until 10th to 20th of November.

Mr. Carter gave his method of storing turnips for winter. They are pulled by cart-loads, and dumped down at different places, without cutting off the tops. They are then covered with earth, and in spring finds leaves all off, and turnips in good condition.

President Satterthwait grows several thousand bushels of turnips every year. We usually dig a trench two and a half feet wide, and one and a half feet deep, and as long as the quantity of turnips require. Into this the turnips are placed, and covered with leaves, until the weather gets too cold, when they receive an additional covering of manure, just thick enough to keep out frost. By this method they can be taken out at any time during the winter.

The following question was next taken up for discussion:

Best Varieties of Potatoes, and Methods of Cultivation.

For the purpose of opening the discussion, Mr. Meehan said that the best variety of potato was the "Peach-Blow."

Mr. Hiller don't pretend to grow the Peach-Blow. In his experience, none so productive and profitable as the Peerless. Has tried Early and Late Rose, but not so satisfactory. Peerless has stronger foliage and endures drought much better. Has raised at the rate of 450 bushels to the acre.

President Satterthwait. The Peerless in our vicinity does not succeed at all.

Mr. Englė fully confirmed Mr. Hiller's views concerning the Peerless. Considers it *the* potato, in his section, for general cultivation. For early potatoes, he prefers the Early Rose, but for winter and spring use, finds the Peerless superior. Plants his potatoes for early use just as soon as can be gotten out in spring. Does not plant late varieties until middle to last of June, which allows them to grow and mature, chiefly during September and October. Selects only the finest for seed, cutting, generally, to one eye. Plants in rows three and one half feet apart, and about twelve to fifteen inches apart on the row. Prefers covering with the hoe. Plants his Early Rose, for late use, from 1st to 15th of July. From 200 to 250 bushels of Peerless per acre is considered an average crop.

Mr. Hoopes considered the Peach-Blow the best variety, but has had most success with Early Rose.

President Satterthwait has grown 500 bushels per acre, but generally averages about 300. Usually plants after corn, plowing in the seed, ten to twelve inches apart, in alternate furrows. Sod is better than corn-stubble. Has not grown Snow-Flake.

Mr. Engle. Snow-Flake, in quality, much resembles the old and well known Mercer.

Mr. Carter stated that, if planted in alternate furrows, more potatoes could be grown per acre, if in every third furrow more could be grown per row, and they would be larger. Considered Snow-Flake similar in quality and productiveness to Early Rose. One crop of his Early Rose had suffered considerably from the depredations of a small worm, that ate into the center of the vine and killed it.

Mr. Meehan. This enemy has sometimes done serious damage, but of late years it is not so destructive.

Mr. Hiller. The Colorado beetle is rather destructive, but easily destroyed with Paris green. Mixes it with lime or plaster, about one pound to twenty-five, and applies it with tin can or box, with perforated lid.

Mr. Cooper has but little trouble in destroying Colorado beetle with

Paris green. Thinks the little worm mentioned by Mr. Carter, more trouble to get rid of.

Mr. Landis inquired what advantage would result from a change of seed, and whether potatoes would do as well on the same ground for a series of years.

Mr. Carter thought a change of seed would produce larger potatoes, but that the quality would be inferior.

Mr. Lint. No potato smaller than a hulled walnut should be used for seed. At least such has been his experience.

Mr. Cooper. My custom has been always to select the best for seed, and to change seed every third or fourth year. Has found it of great advantage to do so.

BEAUTIFYING HOMES

Was the next subject taken up for discussion.

Mr. Engle, in opening the discussion, stated that he had not done as much in that direction as some others, or as he desired. He had suggested the question for discussion, hoping to get some valuable hints. The question was intended to refer more particularly to the beautifying of home, by the planting and cultivating of ornamental trees, shrubbery, and flowers. There is no doubt that, as we beautify our homes, we increase their value. This question should receive serious attention, and if our Society could do or say anything to stimulate a taste in this direction, it would accomplish great good. He spoke of a friend whom he had visited, and of whose taste in this way, he had heard a great deal. When he got within three miles of his property, he noticed a decided improvement in the appearance of the homes along the way, all of which he attributed to the influence of example.

Mr. Lint. There is considerable attention paid to this subject in York county. There has been a decided improvement during the last ten or fifteen years.

Mr. Kendig hoped these discussions would awaken an interest in this question. There is sufficient wealth and good taste in this community for great improvement. Few are aware of how the value of property can be enhanced, by a little investment and labor in this direction.

Mr. Thomas thought nothing in the late International Exhibition will be of more lasting benefit, than the examples and hints there given on the subject of home adornment, both internal and external.

Mr. Hoopes, though he might only repeat what had already been said in this Society, had something to say on this subject. The love of home is inherent, and our attachment therefor is enhanced by its attractiveness. In a pecuniary sense, also, it is worthy of our attention. In

West Chester, years ago, some of the citizens organized a horticultural society, and its refining and beautifying influences are now seen in every door-yard.

Mr. Mechan stated that he could hardly trust himself on this subject. The love of beauty is so innate in human beings, that it seems the love of flowers is the part that distinguishes us from brute creation. When he hears a man remark that the beautifying of homes is only the indulgence of a pride, he sometimes doubts whether such a man is human. To beautify home does not necessarily involve much expense. One of the great merits of the horticultural display at the Centennial, was in common things, not in new and expensive plants. The grounds adjoining horticulturall hall were the admiration of the world. An English paper, in treating of this display, stated that its great merit was its cheapness. So, in improving our own homes, but little labor and expense are necessary. As to the profit of beautifying, there can be no question.

Adjourned to 7 o'clock.

EVENING SESSION.

After being called to order, the Committee on Fruits on Exhibition submitted the following report:

The committee, appointed to examine the fruit on exhibition, report that the apples on the tables were very superior in quality, and were exhibited as follows:

H. M. Engle & Son, twenty varieties.
Prof. I. S. Geist, one variety, for a name.
Levi S. Reist, twenty-two varieties, Canada apples.
Levi S. Reist, eleven varieties, of own growing.
Peter Lint, one variety.
Alfred S. Sheller, three varieties.
Hiller & Son, nine varieties.
John Brady, three varieties.
James Huber, two varieties.
Dr. Eshleman, six varieties.
J. Frank Landis, one plate very fine home-raised lemons.
Thomas Harvey, one variety, for a name.
George D. Stitzel, one pound pear.
Reuben Weaver, four varieties apples.
John Engle, two varieties, for a name.
Rome Beauty, a very showy, desirable fruit.
Ewalt, the finest apple in appearance on exhibition; worthy of planting.

York Imperial has no superior in this section in bearing and keeping qualities.

Millport Sheepnose, from Mr. Reist, a beautiful apple of medium size. Extraordinary yearly bearer.

Major fully retains its reputation as to quality of fruit and annual bearing, especially worthy of further trial.

CASPER HILLER,
ALFRED S. SHELLER,
HENRY M. ENGLE.

On motion, report was accepted, and committee discharged.

The following resolution was offered by Mr. Hoopes, and unanimously adopted:

Resolved, That the thanks of this society are due, and are hereby tendered to the Lancaster County Agricultural and Horticultural Society, for their kindness and hospitality, not only to the individual members of our association, but to the society at large, for furnishing us with a commodious and comfortable room to meet in, and every convenience for displaying our fruits. Also to the press of Lancaster city, for so kindly noticing our meetings, and the very courteous thorough manner in which they have reported our discussions.

Next in order was an interesting essay on *Insect Longevity*, by Prof. Rathvon.

INSECT LONGEVITY.

The following observations may not be exactly germain to the questions usually brought before this Society, nevertheless they may be remotely useful in the inculcation of that patience, perseverance, and thoroughness which are so essential in the circumvention of insect depredations. If we know exactly how long insects, under certain circumstances, may live, we may also know when we are justified in relapsing into apathy, or indulging the idea—after applying a remedy—that our labors now are ended. The records of entomology, wherever intelligent observations have been made, present many extraordinary instances of *insect longevity*, and doubtless as many more have never been recorded in the annals of entomological literature, and two of these, within the past twenty years or more, have come under my own observation.

It may be necessary to premise, however, that the most extraordinary instances of *insect longevity* occur among the *Coleoptera*, (Beetles,) and usually among the "wood-boring" species belonging to that *order*, with, perhaps, the single exception of the seventeen year *Cicada*, usually and wrongly called a "Locust." The details of this subject, as applied to all the different orders of insects, would be interesting and instructive, but I must confine my remarks mainly to the two cases alluded to. In the month of January, 1849, or 1850, a very intimate friend of mine purchased a pair of mahogany sofas that had been manufactured in Lancaster city, and that had been standing in the ware rooms of the manufacturer over a year. These sofas were accordingly removed to the house of the purchaser, and placed in his parlor. About the month of April or May, in 1855, and on several occasions subsequently, he called my attention to the fact, that every time one of these sofas was removed, a small mound of woody debris was discovered at the base of one of the front feet. These sofas were made mainly of pine, and veneered outside with mahogany, except the portion stuffed and covered with hair cloth. About the month of June, 1856, a fine, large, living specimen of *Monohamus Tittilator* was found crawling up the window frame in proximity to the infested sofa foot, which I secured; and from that time forward no more debris of any kind was noticed near the infested foot, or anywhere else on the premises. This insect belongs to the old division *Longicornia*, in the order *Coleoptera*, all of which are "wood-borers" in their larvæ states. A few of them are "stalk-borers," and excavate the canes of the elder, the currant, the raspberry, and other species of shrubbery, to the great disgust of "small fruit" growers. Although I did not *then* know, and do not positively *now* know, the normal longevity of the species of *Monohamus* in their larval conditions, yet I have never entertained a doubt, that the individual that I captured on that occasion, in the room that contained the sofa, was the insect that had infested the foot of that piece of furniture for at least eight years preceding its capture.

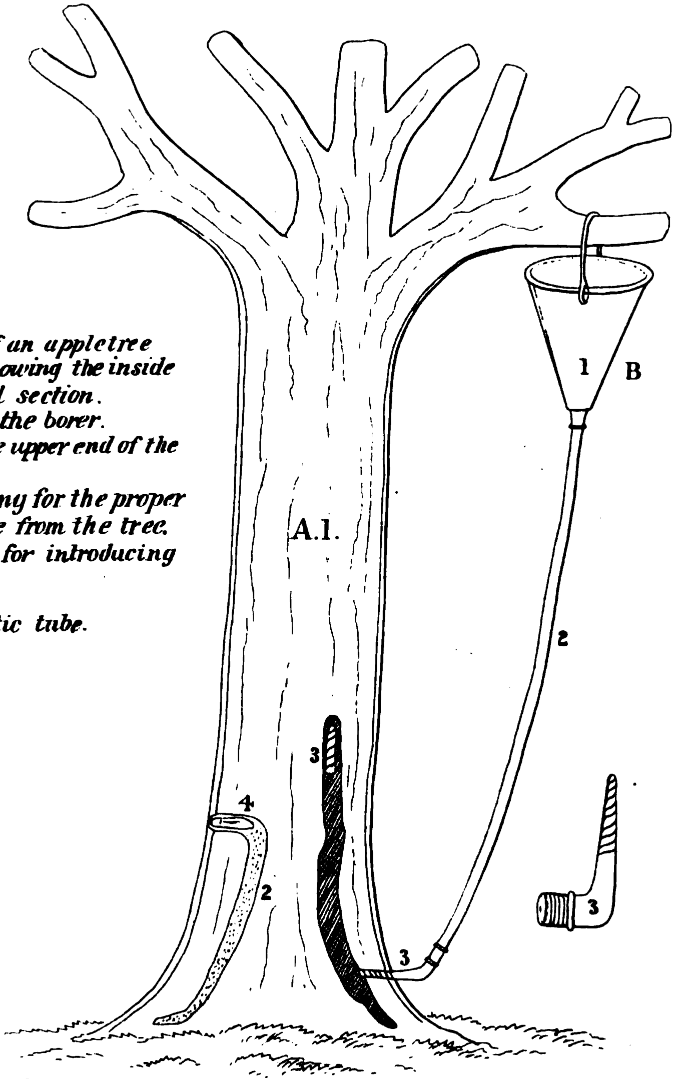
But a still more extraordinary case was finally developed in this city, during the month of November last. In 1860, Mr. Best purchased a cabinet sewing machine, which is yet in his possession. At various periods during the long interval, Mrs. Best, and other members of the family, heard a "ticking" or "clicking" noise in proximity to the machine when it was not in motion, which was attributed to the presence of the "death-watch," which is usually caused by a small beetle belonging to the genus *Anobium*. On opening an unused drawer of the machine, in the month of November last, an unusually large quantity of debris was found in it. The box or cabinet of this machine is made of a dark, hard kind of wood outside; but the bottom, the drawers, and the inside casings are made of pine, and these parts were found perforated, with the burrows of a wood-boring insect, and in one of these burrows a single specimen of *Hylotrupes bullatus* was found. This is also a Longicomian insect, and as no other specimen was found, this single individual must have been working there, "solitary and alone," for a period of *sixteen years*, and may have been there longer.

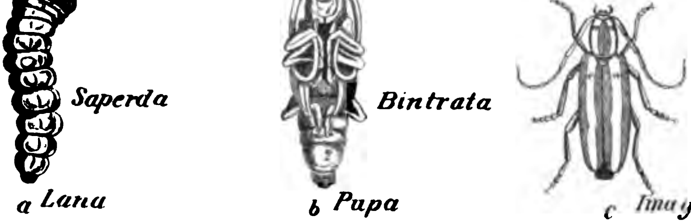
Messrs. Kirby and Spence, in their introduction to entomology, record the case of a gentleman of England, who received the present of a "deal-table," from a friend in India, and *twenty years* thereafter, a beautiful specimen of *Buprestus Splendens* was evolved from it. This individual belongs to, what are popularly called, the "flat-headed wood-borers." It would be contrary to all that is known of wood-boring beetles, to suppose that one generation had succeeded another within their woody excavations, and, therefore, that it was not the same individual that had lived throughout the long periods before mentioned; or, that the egg had been deposited in or upon the sofa and sewing machine, subsequent to their manufacture. The eggs, on the contrary, must have been deposited in the lumber before the furniture was manufactured; or in the timber after it was felled; or in the tree as it stood in its native forest, and the latter seems the most rational conclusion. By way of parenthesis, I may mention another instance of uncommon *insect longevity*, in a species belonging to the order *Hymenoptera*, also a "wood-borer." This order includes the insects familiarly known as Saw-flies, Currant-worms, Humble-bees, Honey-bees, Wasps, Hornets, Yellow-Jackets, Ants, and many others, with various adjectives attached. In the autumn of 1856, I purchased in Philadelphia, a piece of black cassimere, which proved too light for winter use, and therefore it remained on hand until the following summer. These cassimeres contain from twenty-eight to thirty-five yards in a "web," or piece, and are wrapped around pine, poplar, ash, or chestnut shingles, about twenty-seven inches long, from three to six inches wide, and from a quarter to a half inch thick. Some time during the following May or June, when I unwrapped the second ply of this cassimere, I discovered the head of a living insect protruding, which had cut a burrow through not less than sixty plies of the cloth, making as smooth a cut as if done with a sharp punch; and about midway between the surface and the center, I found another insect of the same species, that had cut a similar burrow. On unwrapping the whole piece, I discovered the burrows from which they had issued in the chestnut shingle, around which the cassimere had been wrapped. The shingle was dry, and thoroughly seasoned, therefore it was impossible to say how long the insects may have been in the shingle before they emerged from it; but we may safely conclude that the eggs had been deposited in the tree, before it had been converted into timber and shingles. The body of this insect entirely filled up the burrow, through which it had passed, and behind it the aperture was closed with fine cuttings of cloth, in the form of shoddy. The insect was the *Urocerus cyaneus*, the typical genus of the family Uroceridæ, and allied to the "Pigeon Tremex." If these insects were to become numerous, they would prove very injurious to trees, but being subjected to parasitic infestation, such a contingency rarely occurs. Mr. Kirby states that *Hylotrupes bajulus* has been known to cut through sheet lead an eighth of an inch in thickness, that had covered the rafters of a house in which this insect had bred, and that, on dissection, particles of lead were found in its stomach. This illustrates, that, with whatever contempt we may feel disposed to regard these little animals as too insignificant for human study, yet they are a "power in the land."

The inferentiality is, however, not conclusive, that the normal longevity of these insects is uniformly extended to the periods I have mentioned; for these are both accelerating and retarding causes in the developments of insect life, which may lengthen or shorten their normal periods. The quantity and quality of their natural food; the presence or absence of humidity; a higher or lower temperature than the natural one, may produce these results; nevertheless, some of the wood-boring *larvæ* of beetles, even out in the open forests, are known to require from one to ten years, to effect all their transformations. The well-known "apple-tree borer," *Saperda bevittata*, requires three years, and there is good reason to believe that some of the species of *Prionus* require five years; and, as the former of these is more or less connected with the interests of this association, I will conclude this paper by alluding briefly to a self-operating plan for their destruction, which I think will, at least, be as effective as hanging horse-shoes on the branches, or driving rusty nails into the trees; or boring holes into them, and filling them with sulphur, arsenic or calomel, and then leaving the trees to take care of themselves; although, I do not wish to be understood as speaking disparagingly of such remedies.

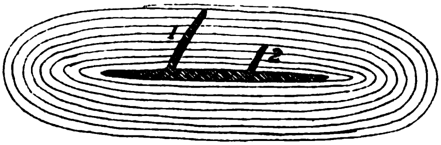
It is not always apparent where these insects enter into the trunk of a tree, for the eggs are deposited at the *base* of the trunk; and when the young larvæ are first excluded they are very small, and make an aperture through a tender part of the bark, not larger than that made by a common pin, and this subsequently closes up again, through the natural growth of the tree. During the first year, these larvæ operate mainly under the bark, sometimes scooping cavities out of the solid wood, but rarely entering it bodily. But the second and third years, and, possibly, also, a fourth year, they penetrate deeper and deeper into the solid wood. The granular debris, found about the base of the trees, is not caused so much by the insects *entering* the tree, or its *presence* there, as it is by its *exit* from the tree as a mature beetle. Exploring their burrows with a barbed steel wire, has been highly recommended to dislodge these grubs; and while they are yet under the bark, this may not be difficult to effect; but when they once enter the hard wood this is not so easy to accomplish, from the fact that their burrows are compactly closed up after them, by their excretal discharges, in the form of agglutinated saw-dust.

A.1. The outlines of an appletree split in two showing the inside of a longitudinal section.
2. The burrows of the borer.
3. The borer at the upper end of the burrow.
4. The pupa waiting for the proper time to emerge from the tree.
B. The apperatus for introducing the liquid.
1. The funnel.
2. The gum elastic tube.
3. The nozzle.




Saperda Bintrata

a Larva b Pupa c Image



C. a web of cloth. 1 and 2 insect burrows (a transverse section)

Now, when you split open a piece of wood infested by these, or other similar larvæ, you will find this substance contains more moisture than the surrounding wood, which it mainly absorbs by capillary attraction, and this attraction, assisted by the attraction of gravitation, is the means by which the worm, in the body of the tree, is proposed to be finally reached. A funnel-shaped reservoir is to be hung to one of the lower branches, a gum elastic hose, of suitable size and length, attached to the bottom, which, at the lower end, is provided with a tapering nozzle, spirally grooved on the outside, forming a coarse screw. When a tree is infested with the borer, the trunk is to be explored, and the burrow of the worm found, and the nozzle carefully screwed therein. Then the reservoir is to be filled with a strong decoction of tobacco, a carbolic dilution, or any other liquid substance of a killing nature, which, by its own specific gravity, will finally submerge the whole burrow of the worm, both upward and downward. Indeed, I have no doubt that water alone would be effective, although it might require a longer time for its accomplishment. I do not claim this as original, but I think it an improvement on a stiff tube, and a trestle, on account of the liability of the latter to be overturned, and the difficulty of making a good attachment.

Perhaps I ought not conclude this paper without stating—what you all may know—that, in the beetle form, these wood-boring insects usually appear, in this latitude, between the 15th of June and the 15th of July; sometimes earlier, and at other times later than those dates, as the season is favorable or unfavorable to their evolution from their pupal sleep. Their presence, then, involves a question of *prevention*, which is anterior to the question of *cure*, and which, if properly attended to, will render the latter unnecessary. A defense against the female's approach to the base of the tree, from an inch below the surface to twelve or fifteen inches up the trunk, and kept there from the 1st of June until the 1st of August, will prevent the deposition of eggs there by the *Saperda*. If this has been neglected, a saline, an alkalinous, or a poisonous liquid applied to the surface, may be necessary. As to the two long-lived species, which I have noticed, it is questionable whether either of them breed so far south as Lancaster county. *Hylotrupes may*, but I think all the species of *Monohamus*, found in this locality, have been brought here in timber and lumber, from the pine regions of our State—at least I have always found them in the vicinity of lumber yards, and never more than one at a time. They *may* also breed in the "Jersey Pines." R.

At the close of his essay, Mr. Rathvon gave some interesting figures concerning the losses sustained by the depredations of insects. He stated that Horace Greeley, from statistics presented him before his death, estimated the loss in the United States at $300,000,000, annually. Prof. Riley thought this low, and estimates the loss to Missouri alone at $20,000,000. In 26 counties, the estimated losses were $15,000,000. In 1873, the Southern States lost over $20,000,000, in the space of two weeks, by the cotton worm (*Anomis Xylina.*) Upward of 100 years ago, the Swedish government became alarmed at the fearful destruction of the ship's timber by the small boring beetle (*Lymexilon Navall.*) After a tedious investigation, it was found that the beetles appeared and laid their eggs in May, and in no other month. Thenceforth, the timber was immersed during that month, and thus saved.

Mr. Meehan thought the subject of the retardation or acceleration of the growth of insects an important one, and not generally understood. The common Lightning bug usually appears in July or August, but last winter, in February, he noticed it in his green-house. It was doubtless taken in with earth used for potting plants, and prematurely developed by the artificial heat.

Mr. Rathvon has noticed similar freaks in the seventeen-year locusts. Has known them to appear at intervals of ten and thirteen years. In 1871, —three years after the appearance of the seventeen-year locusts in Lancaster,—they were found under a pavement in North Duke street. Not being able to pass through this obstruction, their development for a time was suspended.

Mr. Sheller stated that Mr. Reist had prepared a paper on Forest Culture, and asked that it be read before the society.

Mr. Reist was called upon to read it, but declined.

Mr. Hiller had also prepared an article, giving his experience in fruit culture, but said he felt ashamed to present it.

Mr. Hoopes stated that one of the best essays, read at a former meeting of this Society was from the pen of Mr. Hiller. He hoped Mr. Hiller would not decline reading it.

Mr. Hiller being thus strongly urged, read the following essay:

FRUIT CULTURE.

I have been asked for a brief account of my experience in fruit growing. I doubt whether it will be entertaining or profitable to you. If, from my thirty years' experience and observation, I were to answer the question, Is fruit growing profitable? I would answer yes, and I would answer no.

My apple orchard is about thirty years old, contains about two acres, which, in productiveness, is a good sample of those in my vicinity. For ten or twelve years past, we had quantity enough to satisfy any one, and I can say that the profits of it, in the way of food for hogs, for our own use, and what we sold, have been fully up to the profits per acre of our ordinary farm crops. But I think the more acres beyond the two or three to a farm, the worse we would be off.

The trouble with our apples is two-fold: Our apples do not compare favorably, in fairness, with those of Michigan and western New York. For this we blame insects and climatic causes.

The second, and by far the greatest, is, that our hot and dry summers cause our apples to ripen too early in the fall, thereby preventing us from supplying even our own market with choice winter apples.

The past season our crop was immense. If you examine the stands of our fruit dealers, you will not find them, but, in their place, you will find splendid fruit from the West, and from New York.

With pears, I have hardly experienced enough to say much in regard to profit. Blight seems to be a formidable enemy in the way. Of the one hundred and fifty standard pears I planted, twenty years ago, twenty per cent. have perished by blight. At this rate, the time will not be long, in which it can be called an orchard.

Pear trees are very sure bearers, and, where a market is convenient, and if we know what varieties to plant, there should be profit in them.

Peach culture on high ground, during ten years past, has been more successful than any of our other fruits.

Cherries, of late years, have no market value in them. They usually are all right until they begin to ripen, when they begin to rot, and, by the time they should be fully ripe, they are fully rotten. Some years ago, when we wanted cherries for drying, we could strip them off by the handful; now we have to select them out singly. Last year, out of about thirty varieties that promised a yield of two or three thousand quarts, up to a day or two before ripening, we did not get a supply for home use.

Small fruits can, in general, be grown successfully in this county, though, for five successive years, the strawberry crop has been ruined to the extent of from one fourth to three fourths of the crop, by excessive drought and heat in June.

Small fruits cannot profitably be raised on a large scale, for the want of a sufficient market. Our Lancaster friends are paying us respectable prices, but their wants are moderate. It requires considerable tact for a man to sell from two to three hundred quarts per day, during the season. This, of course, is not the daily supply for this city. Various parties grow the fruit on a small scale, for market, and considerable quantities are brought to market by farmers and lot holders, who plant, more particularly, for their home use, but whose surplus, in the aggregate, is large.

From the high price of our land, and from the various causes I have mentioned, the negative would appear to apply to fruit raising, as a specialty, or to the idea of raising fruit, more for the sake of selling, than for home use. The affirmative applies to fruit raising, principally for home use.

It is astonishing, what amount of fruit a family will consume in a year, if it is at hand. By improved modes of drying, and by canning, the fruit can be had every day in the year. By these means, too, we can, to a great extent, bridge over years of failure. A plentiful supply of fruit is not only a saving of bread and meat, but it adds to the health of the family, which is of much more value than dollars and cents. No one having land can afford to be without an orchard. If we cannot sell our surplus at a paying figure, we can feed it to our stock, with advantage.

A liberal distribution of our surplus amongst the poor, is a paying investment. It removes the incentive to steal, and, in times of scarcity, saves us many things, which, under a close, selfish course, we would lose.

CASPER HILLER.

Mr. Meehan never saw pear blight in his vicinity, nor has he ever noticed blight where trees are whitewashed. Mr. William Saunders, of Washington, believes it is an absolute remedy for blight. Has mixed sulphur with whitewash, and has had no blight for years.

Mr. Hoopes endorsed the theory advanced by Mr. Meehan. In extended trips westward, has noticed the beneficial effects of whitewash upon trees. Lime, sulphur, and potash all have a tendency to eradicate fungoid growth. This is the theory, also, of Mr. Saunders, who has restored peach trees to health, by the use of lime and potash, in large quantities.

Mr. Hiller thought pear blight a very mysterious affair, but was satisfied it did not come from the root. Has seen tops of trees die, and stems and roots appear perfectly healthy. Saw one time a Lawrence pear tree that seemed perfectly healthy, but next day was surprised to see the leaves withered. Has frequently seen a single limb of a tree affected with blight, while the rest of the tree seemed entirely healthy.

Mr. Hoopes thought we are getting into very deep water. Because the limb of a tree dies, or shows symptoms of disease, is no reason why the disease should be confined to that limb. Explained his theory of blight.

Mr. Engle thought there is no excuse for not trying the old plan of whitewashing trees. Hoped at next meeting some would be able to report results. These remedies are cheap and simple, and should not be passed by without a trial. Finds of late much complaint of the destructiveness of blight. Mr. Hovey reports more blight in the vicinity of Boston the past season than ever before.

President Satterthwait thought it rather remarkable that a few years since our leading horticultural writers and speakers ridiculed the idea of whitewashing. Even so high an authority as this Society has denounced it in the past as being useless and unsightly. In regard to pear blight, his theory is that it is caused by extreme heat and drought. Has noticed that it is much more destructive in dry seasons, the supply of sap and moisture not being sufficient to support the tree.

Mr. Hoopes stated that the views advanced by him, on the subject of blight, were only his opinions, and given as such. If we could all give this subject more thought and attention, we could elicit some useful and practical information. This species of fungoid growth, known as blight, is one of the smallest known. Under a lense of the highest power it could scarcely be detected.

Mr. Meehan, though much interested in what was said upon this subject, he always felt like approaching it with caution. While we know that pear blight does not develop through the roots, it is known that "yellows" does. In regard to whitewashing trees, he has always advocated it. Has no doubt of its satisfactory results.

Mr. Tracy stated that Messrs. Meehan and Hoopes both advocate the whitewashing of trees. Do they practice it?

Mr. Meehan. I have no blight, except a Dearborn seedling, which had fire blight. This is the only one on my grounds. If heat and drought caused blight, truly this season should have developed it.

President Satterthwait. My trees never blighted until they began bearing, and then it was mostly confined to certain varieties.

Mr. Sheller called attention to the resolutions passed at our last annual meeting, in reference to a general cattle law for the State. He stated that the former resolutions were adopted at his suggestion, and hoped they would receive, also, the endorsement of this body. He read the following resolution, and moved its adoption:

Resolved, That it is the sense of this Society, that our Legislature should pass a general law prohibiting the running at large of horses, cattle, sheep and swine.

Mr. Engle always was in favor of such a law. Have a local act of this kind, applying to our township. In the western portion of the State, there is a decided sentiment against it. Hoped this meeting would re-adopt the resolution, but saw no immediate prospect of any legislation on the subject.

Mr. Landis was heartily in favor of adopting the resolution.

A vote being taken, the resolution was agreed to unanimously.

There being no special subject before the Society for discussion, Mr. Engle proposed that "Nut Culture" be briefly considered. The chestnut, especially, is important, some claiming it to be more profitable than fruit. An improved chestnut commands a good price, and is ready sale at any time, and the trees are easily grown.

President Satterthwait considered this an interesting and important subject. Inquired whether chestnut or walnut could be propagated by budding. Has succeeded in grafting them.

Mr. Hiller has experimented some with chestnut and shellbark. Found no difficulty in grafting the chestnut, but not so successful in budding. Has never succeeded in grafting or budding the hickory nut. The latter should be propagated by budding or grafting, as it does not come true from seed. It will vary in size and quality.

Mr. Brinton stated that the shellbark grows very uniform in his vicinity. Thought it generally came true from the seed. It seems to succeed best in a low, moist soil.

Mr. Hoopes stated that Mr. Hibberd Bartram, of Chester county, has found chestnut more profitable than fruit culture.

Mr. Hiller inquired whether the shellbark could be grafted.

Mr. L. S. Reist has always failed in grafting shellbark on hickory.

Messrs. Hoopes and Satterthwait also thought it could not be grafted.

Mr. Meehan has found no difficulty in grafting the walnut, and was surprised to hear that his friend, Mr. Hoopes, had failed with the shellbark. Thought anything could be grafted, if done at the proper season, and in a proper manner. In grafting the shellbark, good, strong stocks and grafts should be selected. The grafts should be cut in the winter, and kept fresh until spring, by burying in the ground. The grafting should not be done too early in the spring; when the new leaves are putting forth, being about the proper time. By taking this method, he thought there was but little doubt of success.

On motion, adjourned.

Report of Committee on Nomenclature.

To the President of the Pennsylvania Fruit Growers' Society:

The laborious task, coupled with the brief time allotted, make it impossible for your committee to make out a report such as its importance demands, and as our society is entitled to. We, therefore, shall not pretend to claim more than to add a little to the reports of former committees, and, having labored in the same field, you can appreciate our labors, and overlook defects, in the following.

The great variety of Pennsylvania fruits, and especially apples, of great excellence, are well worthy of more attention, and the confusion of names and synonyms, as far as possible, corrected.

There is scarcely a township, where apples grow at all, where we do not find a variety with a local name, which is not much known beyond its immediate neighborhood. In many cases a number of varieties are found, surnamed after well known and popular kinds. Others with local, and all manner of names of odd names, that are very inappropriate to a fine fruit; such as Hogpen, Foxwhelp, Snorter, Sheepnose, &c.;—the latter is especially common, so common, that if Pennsylvania had as many sheep as sheepnoses, it might effect the prices of mutton, and woolen goods. Your committee would encourage the naming and disseminating all valuable fruits, whether old or new, but would suggest that they be introduced with single names, and as short as possible.

The Millport Sheepnose, just forthcoming in our Society's report, we would suggest that the *Sheepnose* be lopped off, before its further dissemination, and named simply *Millport.* What an amount of writing it would save, should a nurseryman have to write a thousand labels, besides carrying along the inappropriate appendage. The many names applied to the same fruit, as well as the many fruits passing under the same name, are the cause of much confusion and dissatisfaction.

Nurserymen are often censured when they don't know all the names and synonyms of fruits, which the rest of mankind, combined, know. It is impossible, to any great extent, to correct the former errors in this matter, but should not our Society make all reasonable efforts to avoid such confusion in the future? Time and perseverance bring about great changes and reforms, and let us labor, that this department shall be no exception.

Your committee would not evade any labors, nor responsibilities, in the discharge of their duties toward completing the Society's catalogue, but would also ask the aid of the general fruit committee to collect, with their annual report, all the information on this subject.

Respectfully submitted.

H. M. ENGLE, *Lancaster county,*
E. SATTERTHWAIT, *Montgomery county,*
J. HIBBERD BARTRAM, *Chester county,*
A. W. HARRISON, *Philadelphia,*
J. W. PYLE, *Chester county,*
Committee.

DESCRIPTIONS OF FRUITS.

MILLPORT (SHEEPNOSE.)

This apple was brought to public notice by Levi S. Reist, of Oregon, Lancaster county.

Four trees of the same kind were found on a property in his town, and has thus far not been traced to any other source.

The trees were evidently grafted, but the original no doubt lost. Fruit, red striped, subacid, of good quality, very showy, and quite productive.

EWALT.

Origin, Bedford county, Pennsylvania.

This is not a new apple, but destined to become one of our most popular early winter apples: Skin yellow, with a crimson blush, rather acid before fully ripe. One of the most showy apples to be found Tree a vigorous grower and good bearer.

MELLINGER.

Origin, Manor township, Lancaster county, brought to notice by Casper Hiller. Skin yellow, striped with red, above medium, good bearer. Ripens from August to December. Considered one of the most valuable apples by all who have tested it.

YORK STRIPE.

One of the most popular winter apples for Pennsylvania. Origin, York county. Fruit medium to large. Oblate, red, partially striped, brisk, subacid, crisp and juicy when ripe. A good bearer. Ripe December to February.

CREEK.

Origin York county. Fruit medium, oblate, yellow striped, with red, calyx large. Mild subacid, quality best. Tree a good grower and excellent bearer. Ripe December to March.

MAJOR.

From Union county, Pennsylvania. Tree a vigorous grower and good bearer. Fruit of good quality, and an excellent keeper. Color red. One of our most promising new winter apples.

WILDER.

Since Hale's Early is generally discarded, peach growers are anxiously awaiting a substitute. The Wilder will probably come nearer filling said gap, than any other new peach thus far tested. Although not as early as Downing, Saunders, Amsden, Alexander, Musser, and others, it will no doubt prove a valuable acquisition to our list of early peaches.

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